

Oct. 15, 1940.

J. E. PRAY

2,218,480

BASE PIN LEAD-IN WIRE CUTTER

Filed April 29, 1939

2 Sheets-Sheet 1

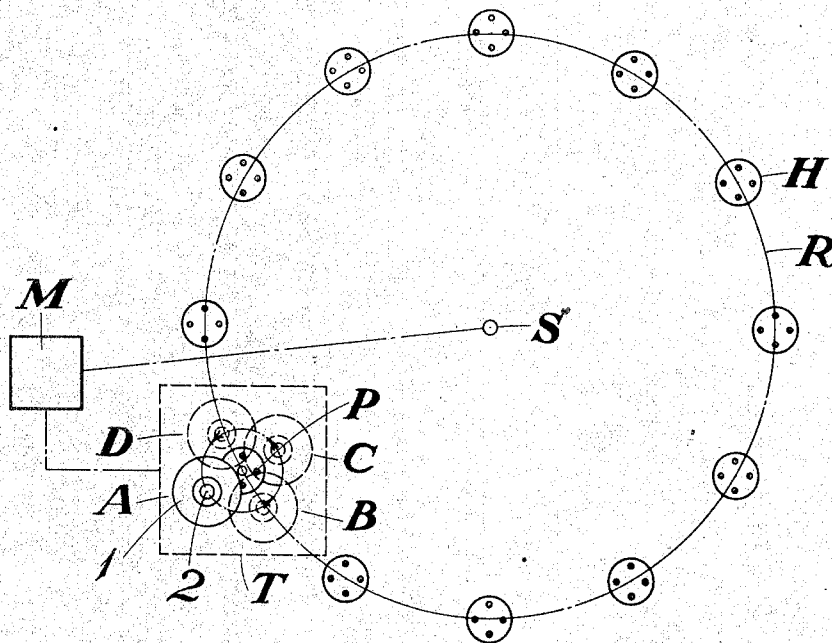


Fig. 1

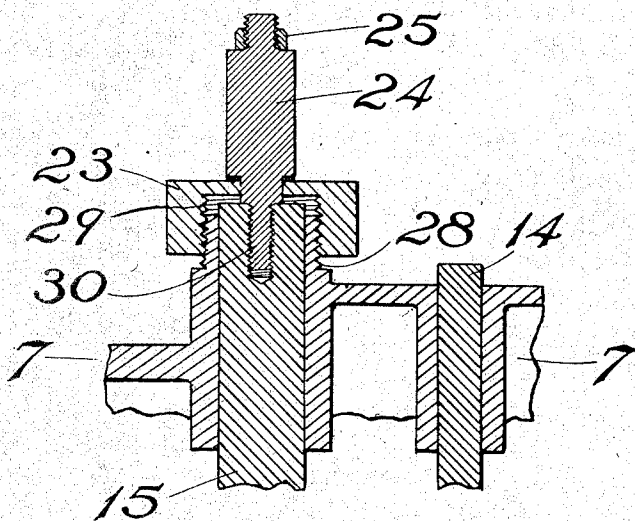


Fig. 3

James E. Pray
INVENTOR

BY

John J. Logan
ATTORNEY

Oct. 15, 1940.

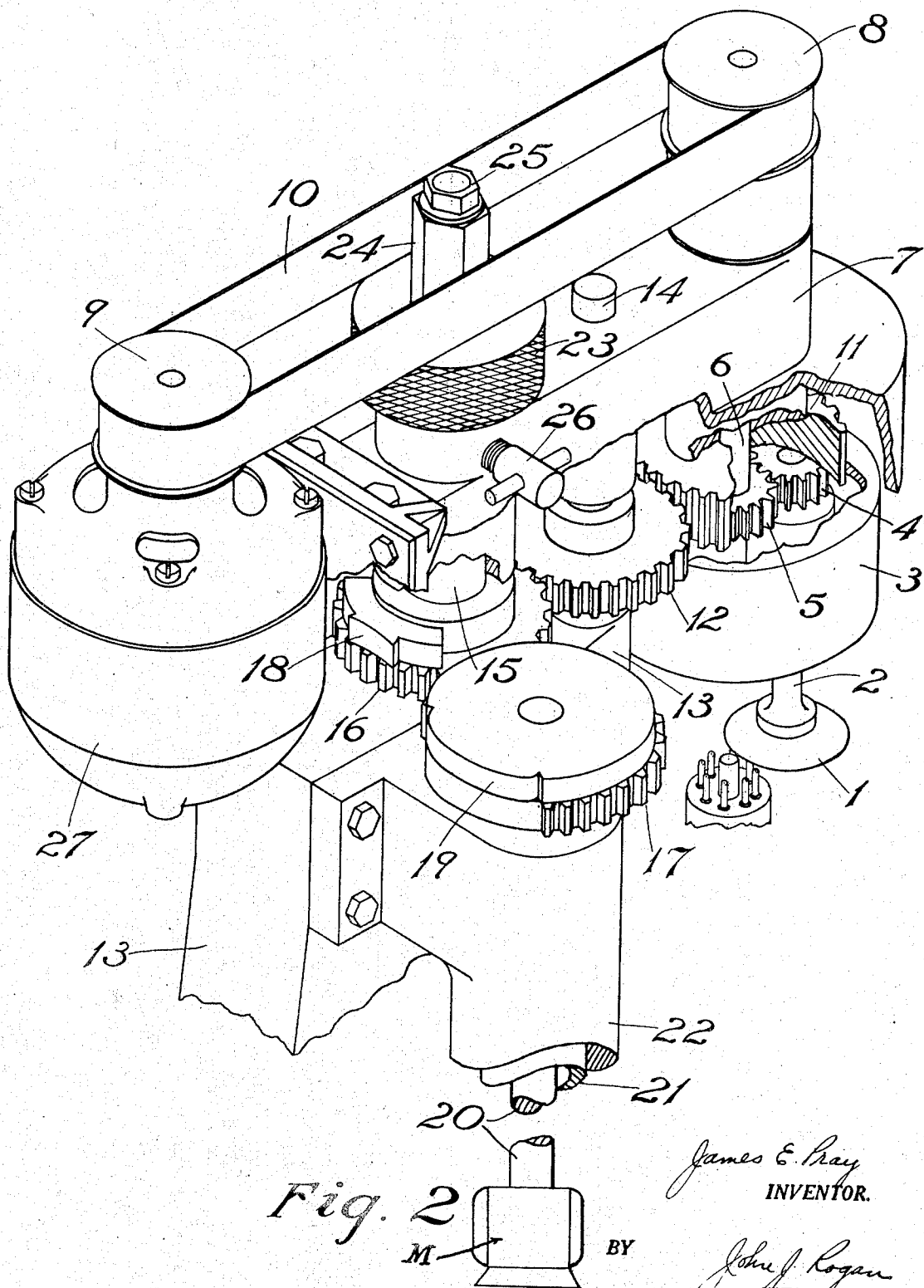
J. E. PRAY

2,218,480

BASE PIN LEAD-IN WIRE CUTTER.

Filed April 29, 1939

2 Sheets-Sheet 2



UNITED STATES PATENT OFFICE

2,218,480

BASE PIN LEAD-IN WIRE CUTTER

James E. Pray, Danvers, Mass., assignor to Hygrade Sylvania Corporation, Salem, Mass., a corporation of Massachusetts

Application April 29, 1939, Serial No. 270,738

8 Claims. (Cl. 140—146)

This invention relates to wire cutting devices and more especially to a wire cutter for severing or trimming the ends of lead-in wires in such devices as radio tubes, electric lamps and the like.

A principal object is to provide an improved cutting device for severing the projecting ends of lead-in wires which are threaded through corresponding contact prongs carried by an electrical device.

In the manufacture of such devices as radio tubes, it is customary to fasten a tube base to the bulb on a "basing" machine provided with a rotatable platform or basing "reel," which is indexed in a step-by-step movement to bring each tube or bulb to a plurality of successive positions. At one of these positions, that is, after the base has been cemented to the bulb with the lead-in wires threaded through the corresponding base contact prongs, a cutting wheel is swung into cutting position. By reason of this swinging movement of the cutting wheel, the wheel follows an arcuate path in an oscillatory motion so that the protruding ends of the lead-in wires are cut off at different angles with respect to the several radia extending from the prongs to the center of the base. Furthermore, such a swinging cutter is applicable only to tube bases where the prongs are all of substantially the same length and its use has been confined therefore to tubes with so-called standard bases such for example as the tubes sold under the "Sylvania" type numbers 24, 80 and 43. However, there are other types of tube bases, for example so-called "Octal" bases wherein a central locking and guiding pin is provided on the base which is longer than the associated prongs. Examples of such tubes are "Sylvania" types 6F6-G. It is obvious therefore, that the conventional swingable cutter cannot be used to sever or trim the lead-in wires on "Octal" base tubes.

Consequently, it is another principal object of this invention to provide a cutting device which is capable of use with any stationary or known form of basing machine so that it can be used to trim or sever the lead-in wires of standard base tubes as well as "Octal" base tubes.

Another object is to provide a cutter which, instead of being swung or oscillated into and out of cutting relation, is revolved in a circular path around the several contact prongs.

A feature of the invention relates to an improved cutting attachment for use on standard radio tube basing machines.

Another feature relates to a lead-in wire cut-

ting device for basing machines, which device is readily adjustable to vary the position of the cutting reel with respect to the tube contact prongs.

A further feature relates to a lead-in wire trimmer for radio tube basing machines of the intermittent moving reel type, and having improved means for positioning a high speed rotary cutter successively with respect to the prongs of a radio tube base, during the stationary intervals of said reel.

A still further feature relates to the novel organization, arrangement and relative location of parts which constitute an improved lead-in wire trimming arrangement for radio tubes and the like.

In the drawings which represent a preferred embodiment, Fig. 1 is a schematic plan view of a typical radio tube basing machine and wire cutter according to the invention.

Fig. 2 is an enlarged perspective detail view of the cutter device of Fig. 1.

Fig. 3 is a vertical sectional view of Fig. 2 to show the manner of adjusting the cutter wheel vertically.

As is well known, most radio tubes are provided with bases having contact prongs usually in the form of tubular metal pieces through which the various lead-in wires are threaded. The tubes are usually automatically based on a standard basing machine of known construction, the basing operations being generally as follows. The operator threads the lead-in wires through the respective prongs, the wires being longer than the prongs so as to facilitate the threading operation. Consequently, after the operator has properly adjusted the base on the bulb, the lead-in wires protrude beyond the ends of the prongs and the excess length of the lead-in wires must be trimmed off prior to soldering the ends of the wires to the ends of the prongs. In order to obtain a rigid bond between the base and the tube, the base is filled with a soft or green cement before the above-noted threading operation, and this cement is later hardened by baking.

The basing machine which is shown schematically in Fig. 1, comprises a turn-table or basing reel R which is provided with a shaft S adapted to be rotated in a step-by-step movement from a suitable motor M. The reel is provided around its periphery with a plurality of heads or bulb holders H whereby the bulbs when loaded on to the reel are brought to successive positions, amongst which are the baking positions for hardening the basing cement. In one type of standard

basing machine of known construction, there are 48 heads H which are equipped with clamps to hold the tubes with the bases and base prongs extending upwardly so that the bases can be subjected to a baking heat in the successive positions of the reel R. In this standard machine therefore, the heads are spaced apart $7\frac{1}{2}$ degrees of circular arc, the mechanism being such that the reel R is held stationary for a predetermined interval between each indexing step. In the last position, the lead-in wires are cut off by a cutter wheel rotating continuously at high speed. As pointed out above, in the conventional basing machine, the cutter wheel is carried by an arm or lever which is moved in a horizontal plane from one side of the base to the other over the center of the base, thus passing over the ends of all the base prongs. With such an arrangement, the cutting wheel must be moved bodily from one side of the base to the other in an oscillatory motion and, therefore, must clear the ends of all the prongs. However, in accordance with the invention, the cutting wheel which is designated generally in Fig. 1 by the numeral 1, revolves in a complete circle around the center of the tube base. Merely for explanatory purposes, the reel R is shown as having 12 heads H, into which tubes are loaded as above described. The cutting wheel 1 is adapted to be rotated continuously at high speed around the axis of its own shaft 2 preferably by a local motor 27, and the axis of the cutting wheel is also adapted to be revolved around the axis of the base or head in a step-by-step movement which is synchronized with the stationary intervals of the step-by-step movement of reel R. For this purpose, the cutting wheel assembly may be revolved under control of the same motor M which drives the reel R, through suitable intermittent gearing as shown in detail in Fig. 2. Merely for explanation, the tube bases are shown as having four prongs P preferably arranged in a circle around the base axis. Consequently, it is necessary to revolve the cutting wheel in successive steps to four successive positions where the wheel engages the corresponding prong P, it being understood that the heads H are so designed that the bulbs when properly loaded have the ends of the prongs just slightly below the edge of the cutter wheel.

The revolution of the cutter assembly is so related to that of the reel R that when the reel is rotating, the cutter wheel 1 is stationary in the full line position A of Fig. 1 and when the reel R is stationary, the cutter wheel 1 is revolved to the successive positions B, C, D, as indicated by the arrowed circular dot-dash line in Fig. 1. Thus, the cutter wheel is subjected to a continuous high speed rotation by its own motor 27 and is revolved in a circular path over the four prongs under control of motor M. The mechanism for effecting these two movements is shown in detail in Fig. 2. The cutter wheel 1 is fastened to the lower end of shaft 2 which rotates around its own vertical axis, being driven from a motor 27 through pulleys 8, 9, belt 10, shaft 6, gear 5 and gear 4. The shaft 2 is retained in a rotatable housing 3, by suitable ball bearings (not shown) so that as the housing 3 rotates around its own vertical axis, it carries with it shaft 2 and wheel 1. Shaft 2 has gear 4 fastened to its upper end which is driven by a gear 5 fastened on the lower end of shaft 6. Shaft 6 is retained by suitable bearings to both housings 3 and 7. Housing 3 is thus free to rotate around, but is vertically restrained on, shaft 6. Pulley 8 is fastened to the

upper end of shaft 6 and is driven by belt 10 as above mentioned. Thus, the cutting wheel 1 is maintained in continuous high speed rotation and is also capable of revolution around the axis of shaft 6. This revolving motion of the cutter wheel is synchronized with the intervals between the indexing movement of the base reel R (Fig. 1) by gears 11, 12, 16, 17, and cam plates 18, 19, and shaft 20, it being understood that the mechanism shown in Fig. 2 is supported on a stationary support 13 suitably mounted with respect to the reel R. Gear 11 is an integral part of the housing 7 and therefore moves freely around shaft 6. Gear 12 however, is intermittently driven so that for each intermittent period, it effects one complete revolution of gear 11. This intermittent motion is controlled by gear 16 which rotates freely on shaft 15 carried by support 13. Likewise, gear 12 moves freely on shaft 14 which is also fixed to support 13. Gears 12 and 16 are retained by suitable bearings (not shown) on the support 13.

Affixed to gear 16 is a cam plate 18 and affixed to gear 17 is a cam plate 19. Gear 17 is fixed to the upper end of shaft 20 which is directly coupled through suitable gearing to the indexing mechanism which drives reel R. The timed relation between the indexing movement of the reel R and the intermittent revolution of the wheel 1, is controlled by the proper choice of the number of teeth on the respective gears 16, 17, and the proper choice of the active arc of the cam plates 18, 19. The active arc of these cam plates is so chosen, that the cutting wheel is maintained in the position A (Fig. 1) during the indexing movement of the reel R while the ratio of the several gears corresponds to a full revolution of gear 11 during the stationary intervals of the reel R. It will be understood that corresponding to the cam plates and to the gap in the mutilated gear 17, the motion of gears 16, 12 and 11 is interrupted, while gear 17, cam plate 19, and cam plate 18 are engaged during the continuous rotation of shaft 20. Numeral 21 represents a tube in which shaft 20 is housed. The bearing 22 which retains shaft 20 and gear 17 is fastened to support 13 as indicated. It will be understood of course that the shaft 6 is arranged so that it is concentric with the center pin or axis of the tube base as indicated in Fig. 2.

In order that the cutting wheel may be adjusted vertically with respect to the ends of the tube prongs P, the housing 7 and housing 3 are arranged to be vertically adjustable on shaft 15. This adjustment is effected by a hand nut 23 which moves freely around shaft 15 (Fig. 3), the nut 23 being retained fixed in a vertical direction with respect to shaft 15 by a bearing formed between the end of shaft 15 and the shoulder on a threaded nut 24 which is threaded into the upper end of shaft 15. The housing 7 which is therefore slidably adjustable on the shaft 15 is provided with a threaded extension 28 which is engaged by the internally threaded portion of nut 23. Consequently, a rotation of nut 23 will result in a vertical displacement of housing 7. Hand screw 26 (Fig. 2) serves as a set screw for locking the housings and cutter in their adjusted vertical positions. Nut 24 carries a screw end 30 at its lower end whereby a rigid connection is made to shaft 15 to facilitate mounting of the nut 23. Preferably, the nut 24 is long enough so that it can carry a suitable guard plate or housing (not shown) for the belt 10. This guard housing may be fastened in place by the nut 25.

It will be observed therefore, that the gears 75

12, 16, 17, (Fig. 2) do not change their position with respect to support 13 during the vertical adjustment of housings 3 and 7, as they are retained by their respective bearings to support 13.

5 Gear 11 however, does move vertically during the adjustment and for this purpose, gears 11 and 12 are sufficiently wide for maintaining their meshed engagement during the adjustment.

10 It is believed that the manner of operation of the cutting operation will be clear from the foregoing description, it being understood of course, that various changes and modifications may be made without departing from the spirit and scope of the invention.

15 What I claim is:

1. A basing machine for radio tubes and the like comprising a rotatable support to receive a plurality of tubes with bases, means to index said support to a plurality of positions at least one of which is a basing position and at least one of which is a wire trimming position, means associated with the wire trimming position for severing the protruding ends of a lead-in wire, the last-mentioned means including a high speed rotating cutting wheel, and means to revolve the wheel bodily around the axis of the tube base, said revolving movement being effected separately from the rotational cutting movement.

2. A basing machine according to claim 1 in which means are provided to revolve the cutting wheel intermittently in a timed relation to the step-by-step machine of said support.

3. A basing machine according to claim 1 in which means are provided to revolve said wheel 35 bodily only during the intervals when said support is stationary.

4. A lead-in wire trimming device comprising a cutting wheel, motor means to rotate said wheel continuously at high speed, means to support a 40 pronged device with the pronged ends in substantial alignment with the edge of the cutting wheel, and intermittent means to revolve said wheel bodily around said prongs to sever the

ends of wires protruding from said prongs, the last-mentioned means including a separate motor for driving said intermittent means.

5. A wire trimmer of the character described, comprising a cutting wheel, a motor for rotating said wheel continuously at high speed around the wheel axis, and means to intermittently revolve said wheel about another parallel axis, the last-mentioned means including an intermittent gear train coupled to said wheel, and separate motor 10 means therefor.

6. A wire trimming device of the character described, comprising a support, a rotatable housing carried by said support, a cutting wheel mounted eccentrically on said housing but capable of independent rotation around its own axis, a motor coupled to said wheel shaft for continuously rotating it at high speed, a gear carried by said housing, and an intermittent gear train cooperating with said gear to revolve said housing intermittently independently of the rotation of said wheel, and separate motor means for operating said intermittent gear train.

7. A wire cutting device according to claim 6 in which said support is slidably adjustable to vary the height of said cutting wheel with respect to the work without disturbing the meshed relation of the various gears.

8. A trimming mechanism for severing the ends of lead-in wires protruding from the prongs of a pronged device such as a radio tube and the like comprising a cutting wheel, a support for said device, motor means for automatically moving said device into cutting relation with said wheel with the edge of the wheel in substantial alignment with the ends of the prongs, intermittent means operated by said motor means for causing said wheel to revolve bodily around said prongs to sever said protruding lead-in wires, and separate motor means for operating said wheel at a high cutting speed.

JAMES E. PRAY.