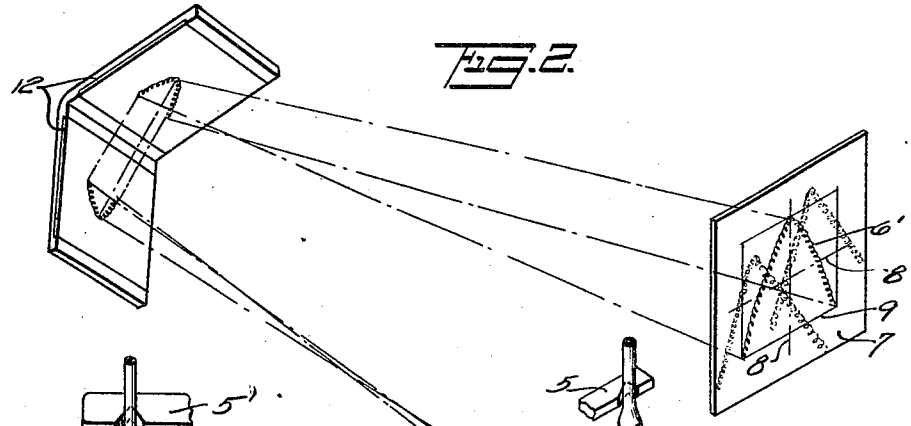
March 12, 1929. C. C. BOHNER 1,705,356

METHOD OF LOCATING AND POSITIONING FILAMENT MOUNTS DURING THE SEALING-IN OF SUCH MOUNTS

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FIG. 2.



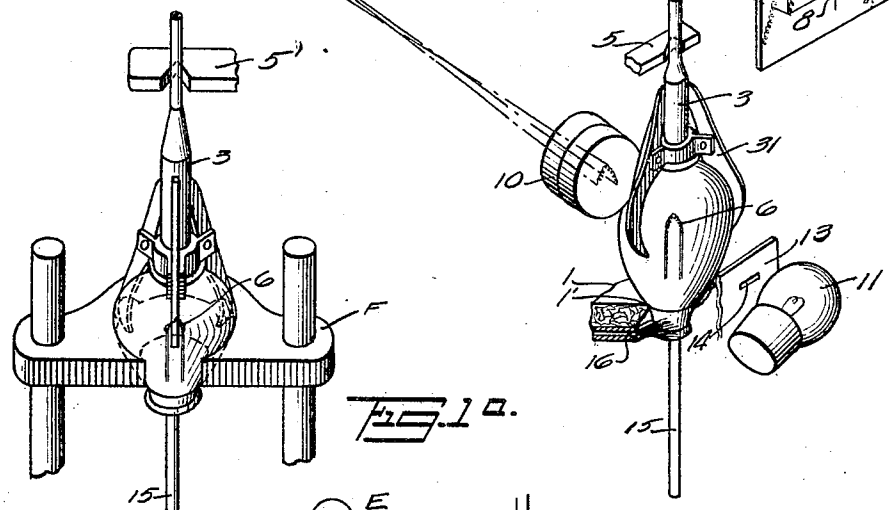


FIG. 1a.

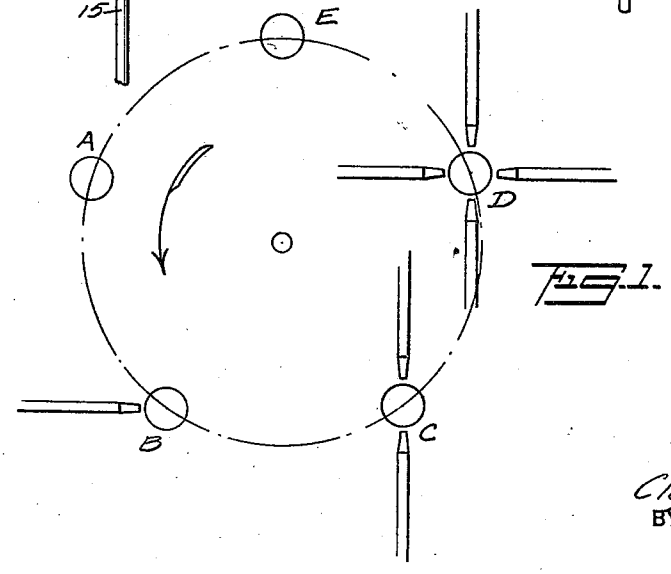


FIG. 1.

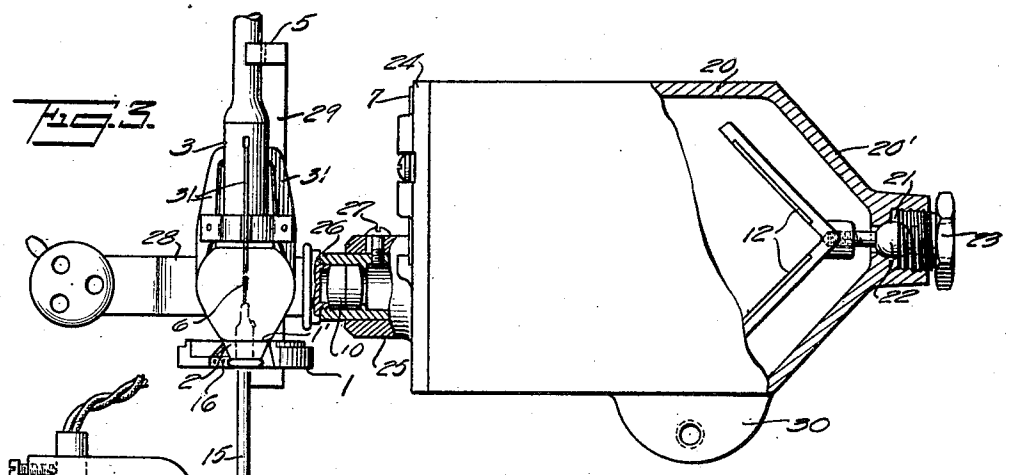
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METHOD OF LOCATING AND POSITIONING FILAMENT MOUNTS DURING THE SEALING-IN OF SUCH MOUNTS

Filed Dec. 5, 1925 2 Sheets-Sheet 2

FIG. 3.



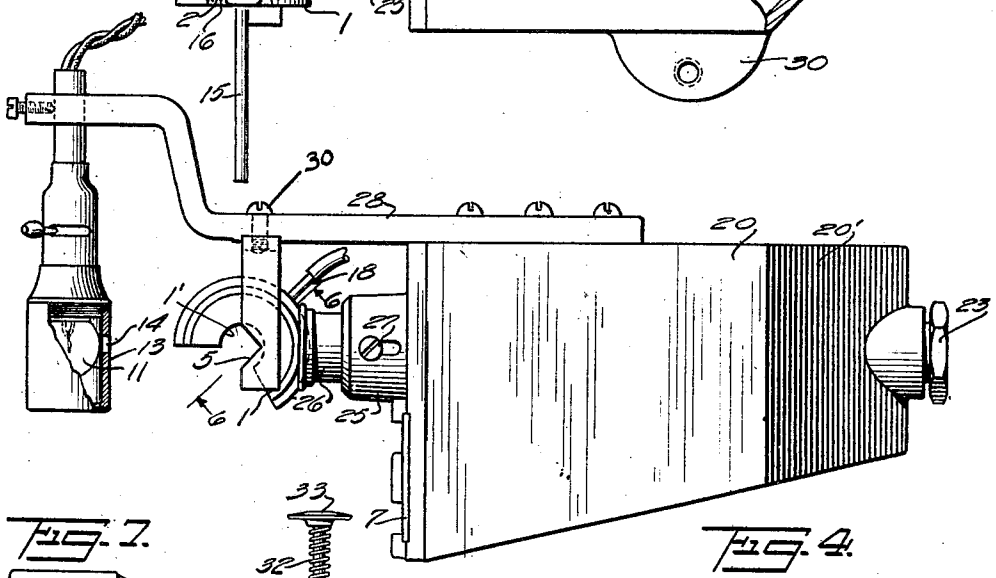


FIG. 4.

FIG. 7.

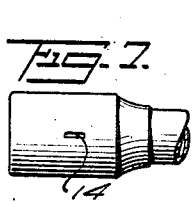
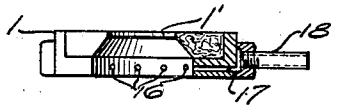


FIG. 5.

FIG. 6.



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UNITED STATES PATENT OFFICE.

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METHOD OF LOCATING AND POSITIONING FILAMENT MOUNTS DURING THE SEALING-IN OF SUCH MOUNTS.

Application filed December 5, 1925. Serial No. 73,303.

This invention relates to the manufacture of electric incandescent lamps and particularly to a novel method and apparatus for adjusting the filaments thereof with reference to the base line of the bulb necks during the sealing-in of the mounts.

This invention relates more particularly to miniature lamps used as for example in automobile projector lamps, although certain features thereof are applicable to projector lamps generally, and the object of the invention, stated generally, is a method and apparatus readily usable by the operator in conjunction with the standard mount sealing-in machines for accurately and uniformly positioning and locating the filaments with respect to the bulb necks which carry the lamp bases whereby uniform focal adjustments for different lamp bulbs are assured. Methods for centering the filaments within lamp bulbs have been tried and used to some extent, as for example by reheating the mount seal of commercial lamps and centering the filaments thereof with respect to the bulb surface by utilizing the filament itself as a light source in conjunction with optical means,—but because of the non-uniformity of bulb shapes in practice the centering of the filaments does not entirely solve the problem of uniform focal adjustments for different lamp bulbs, and moreover when the centering takes place after the evacuation and sealing-in the lighting of the filaments and reheating of the bulb are not only expensive, but often result in impairments and breakages of the bulbs. It has also been attempted to solve the problem by attaching the bases to the evacuated and sealed-in lamp bulbs in such a manner as to bear uniform relations with respect to the filaments, but this method is unsatisfactory and uneconomical for the manufacture of miniature lamp bulbs on a quantity production basis.

My invention enables the operator to accurately and uniformly locate and position the filaments and mounts with reference to those portions of the bulb necks to which the bases are to be attached, before evacuation and during or immediately following the sealing-in of the mounts on standard machines. The apparatus for practicing my invention is disposed closely adjacent the sealing-in machine in convenient reach of the operator, and includes a ring-like holder or gauge for the base line of the bulb necks, together with an optical projecting system including a light source for projecting an enlarged shadow image of the filaments upon a lighted screen which is so adjusted with reference to the holder or gauge for the bulb necks as to enable the operator to instantly adjust the filament mount so as to bring each filament into its predetermined relation with respect to that portion of the bulb neck bearing against the holder or gauge. The operator removes the bulbs one by one from the last position of the sealing-in machine and while the seals are still hot and plastic inserts them in the holder or gauge, whereupon any necessary filament adjustments are determined and made by observing the position of the enlarged image on the screen and manipulating the mount to effect any necessary adjustment.

My invention also includes means for facilitating and speeding up the setting of the adjusted mounts without impairing or rupturing the seal, as by properly adjusted and proportioned cooling blasts directed against the bulb necks while positioned in the apparatus.

A further object of the invention is a simple and easily and readily adjustable apparatus for facilitating the practice of my invention.

For a better understanding of the invention, reference may be had to the accompanying drawings forming a part of this application, wherein—

Fig. 1 is a diagrammatic view of certain parts of a standard mount sealing-in machine for miniature lamps,

Fig. 1ª is a view of the bulb holder on the sealing-in machine,

Fig. 2 is a diagrammatic illustration of an apparatus usable therewith for practicing my invention,

Fig. 3 is an elevational view of the apparatus,

Fig. 4 is a plan view thereof,

Fig. 5 is an end view thereof,

Fig. 6 is a sectional view of the adjustable

holder or gauge for the lamp bulb necks, and Fig. 7 is a side view of the artificial light source.

Referring to the drawings where like numerals designate similar parts throughout, I have indicated diagrammatically in Fig. 1 the several stations of an automatic mount sealing-in machine, the positions A and E being the take-off and loading positions and the positions B, C and D being the sealing-in positions. It is understood that in these standard machines the operator assembles the lamp bulbs and the mounts to be sealed to the necks thereof in either position E or A, and that during the progression around of the assembled bulbs to the various positions, the sealing of the mounts to and within the bulbs is effected in the usual manner. In Fig. 1ª I have indicated the bulb holder F of the standard machine which comes to rest in positions E and A where the bulb with its hot plastic seal may be removed and the filament mount adjusted as hereinafter described.

Closely adjacent the sealing-in machine and in convenient reach of the operator, there is disposed an apparatus including a holder or gauge 1 which is adapted to receive the neck of a bulb 2 as the operator removes the same from the sealing-in machine, as for example by means of a suitable gripping holder 3. The holder 1 is ring-like in form with a section removed therefrom to permit the lateral positioning of the bulb neck therewithin and includes a bearing or gauge edge 1′ against which the base line or shoulder of the bulb neck firmly rests. Another guide 5 is positioned above the lamp bulb 2 and is of V shape for receiving the handle of the holder 3 to assure the approximate alinement of the holder 3 and the bulb 2 with respect to the ring holder 1. In conjunction therewith I have indicated diagrammatically in Fig. 2 an optical projecting system for projecting an enlarged shadow image of the filament 6 of the lamp bulb 2 upon a lighted screen 7, the latter containing the cross lines 8, and if desired, suitable boundary lines 9 forming a closed rectangle within which an enlarged shadow image 6′ of the filament 6 is projected when the filament 6 bears the correct relation to that portion of the neck of the bulb 2 bearing against the holder or gauge 1. The projector system includes a standard lens 10, a light source 11 disposed on the opposite side of the filament 6 and the lamp bulb 2 from the lens 10, and the reflecting mirrors 12 arranged at right angles to each other and at a substantial distance from the lens 10 and the screen 7. The mirrors are arranged so as to reflect the image to the screen 7 which is disposed to one side of the optical axis of the lens 10 and above the level thereof. Preferably the lamp bulb 2 is closely adjacent the lens 10 and the light source 11 may also be conveniently near thereto. An opaque screen 13 is indicated between the bulb 2 and the light source 11 and contains a slit 14 in line with the filament of bulb 11, the filament 6 and the axis of the lens 10.

In accordance with my invention the operator in charge of the mount sealing-in machine grips by means of the holder 3 the bulb 2 while it is either in the position E or A, where the holder F is stationary, and in the manner indicated in Fig. 2 inserts it in the position indicated, while the seal is still plastic and hot with the bulb neck base line bearing against the ring gauge 1 and the handle of the holder 3 resting within the V shaped guide 5 to properly aline the lamp bulb. The sealing-in machine also includes an alining guide 5′ similar in construction to the guide 5, which is mounted upon the stationary part of the machine frame and located at position E (or A) just above the holder F when it comes to rest thereunder. This enables the operator to properly aline the holder 3 with reference to the center line of the bulb 2 when removing the bulb and inserting it in the holder 1, thereby assuring the proper alinement when the holder is positioned in guide 5. Upon the insertion of the lamp bulb in the holder, an enlarged image 6′ of the filament 6 is projected upon the screen 7 and if this image 6′ falls outside of the rectangle 9 or with the apex of the V off-set from the vertical gauge line 8, as for example in any of those positions indicated in dotted lines, the filament 6 may be readily and quickly brought to its accurate and predetermined position with reference to the base line or that portion of the bulb neck bearing against the gauge 1 by manipulating the exhaust tube 15, the correct position being indicated by the image 6′ being contained within the rectangle 9 with the apex of its V disposed on the vertical line 8. Such manipulation and adjustment is made of course while the lamp bulb is held by one hand within the holder or gauge 1 and can ordinarily be effected before the seal has had time to cool and set. In fact, adjustment can be effected so quickly that it is desirable to facilitate and speed up the cooling and setting of the plastic seal while within the holder 1. This is conveniently effected by little air blasts playing upon the neck of the bulb and in the particular embodiment shown I have indicated a plurality of radially disposed blasts, these being directed from radially disposed openings 16 in the interior of the ring 1 which openings lead to an annular air pressure chamber 17 which is furnished with air pressure by means of the tube 18. By the aid of this cooling blast the plastic seal becomes set almost immediately after any adjustment of the filament mount which may be necessary, and the latter adjustment can be made almost instantaneously after the positioning of the bulb with its plastic seal within the holder 1. The lamp bulbs which

thus have their mounts sealed in and adjusted with reference to the base line of the neck or that portion of the neck to which the bases are to be attached will have approximately the same adjustments within a single reflector so that an adjustment for one bulb will ordinarily answer for the adjustment of all bulbs within this same reflector.

In Figs. 3–7 inclusive I have illustrated an apparatus embodying the elements diagrammatically set forth in Fig. 2. The lens 10, the mirrors 12 and the screen 7 are carried by the casing 20, the latter being formed, as for example, of a single casting whose one end is formed of the members 20′ converging outwardly and having a small chamber 21 for the reception of the adjustable ball joint 22 fixed to a member which carries the mirrors 12. The mirrors 12 are tightened after adjustment to the required position by an externally screw-threaded plug 23 which has a seat on its end corresponding to the shape of the ball 22 and by screwing this plug 23 home within the screw-threaded opening, the ball 22 and the mirrors 12 are securely fixed in their properly adjusted positions. The casing 20 is provided on its opposite end with a removable cover plate 24, and this plate is provided with an outwardly extending socket 25 in which is carried the lens 10, the lens 10 being contained in a longitudinally adjustable cylindrical casing 26. The longitudinal adjustment is effected by loosening the screw 27 and moving it back and forth, the screw 27 traversing a slot in the upper side of the nozzle 25. The nozzle 25 and the lens 10 contained therein are disposed in substantial alinement with the lower of the two mirrors 12. The guide 5 and the holder or gauge 1 and the light source 11 are carried by a bracket or bar 28 fastened in any suitable manner to the side of the casing 20. The lamp bulb 11 is carried by a suitable lamp socket mounted on the outer end of said bar 28, the bar having its outer end off-set by a bend as indicated to bring the light source 11 in line with the lens 10 and the lower of the mirrors 12. The guide 5 and the lamp holder or gauge 1 are carried by a member mounted at right angles to the bar 28, this member being in the form of a U, one of the legs of the U having the V shaped guide 5 formed therein and the other or lower leg carrying the ring-like holder 1, the latter being secured thereto in any suitable manner. The apex of the V of the guide 5 should preferably be in line with the center of the ring-like gauge 1. The U shaped bar 29 carrying the guide 5 and the gauge 1 is adjustably fixed to the bar 28, as for example by a holding screw 30 which is movable in a slot provided in the bar 28, so that the bar 29 with its holder can be adjusted to the required position for sealing-in the mounts with reference to the cross lines of the screen 7. At 30 is indicated a suitable foot or bracket for attaching the apparatus in any suitable position convenient to the operator.

The lamp holder or gripper 3 includes three spring actuated fingers 31 which are pivoted to the sides of the holder and a spring 32 normally tends to hold the plunger 33 in its outermost position, which plunger has on its inner end a cam 34 for engaging the inner ends of the pivoted fingers 31 and tends to close the fingers 31. The lamp can be released from the fingers by simply pushing the plunger 33 against the tension of the spring 32 down within the barrel of the holder 3.

Having thus described my invention, what I claim and desire to protect by Letters Patent is:

1. The method of locating and positioning filament mounts in lamp bulbs immediately following the sealing-in process so as to cause the filaments to bear predetermined uniform relations with respect to predetermined base lines of the bulb necks which consists in positioning the bulbs as they come from the sealing-in machine upon a gauge support bearing against the predetermined base line, and while the seals are still plastic projecting shadow images of the filaments upon a screen bearing a predetermined fixed relation to the gauge support and adjusting the filament mounts to bring the filament shadow images to a definite fixed position on the screen.

2. The method of locating and positioning filament mounts in lamp bulbs immediately following the sealing-in process so as to cause the filaments to bear predetermined uniform relations with respect to predetermined base lines of the bulb necks, which consists in positioning the bulbs as they come from the sealing-in machine upon a ring-like gauge support with their necks extending therethrough and bearing thereagainst, and while the seals are still plastic projecting enlarged shadow images of the filaments upon a screen bearing a predetermined relation to the gauge support and adjustitng the filament mounts before they become set to bring the filament shadow images to a definite fixed position on the screen.

3. The method of locating filament mounts in lamp bulbs immediately following the sealing-in process so as to bear uniform relations to the bulb necks to which the bases are to be attached which consists in projecting a shadow image of each filament upon a screen and adjusting the mount while the seal is still hot so as to bring the shadow image within a prescribed area on the screen which bears a predetermined relation to the bulb neck.

4. The method of locating filament mounts in lamp bulbs immediately following the sealing-in process so as to cause the filaments to bear predetermined uniform fixed relations to predetermined portions of the bulb necks to which the bases are attached which consists in projecting enlarged shadow images

of the filaments upon a screen having a prescribed area bearing a predetermined fixed relation to said portions of the bulb necks and while the seals are still plastic adjusting the mounts to bring the filament shadow images within said prescribed area.

5. The method of locating and positioning filament mounts in lamp bulbs immediately following the sealing-in process so as to cause the filaments to bear predetermined uniform relations with respect to predetermined base lines of the bulb necks which consists in positioning the bulbs as they come from the sealing-in machine upon a gauge support bearing against the predetermined base line, while the seals are still plastic projecting shadow images of the filaments upon a screen bearing a predetermined fixed relation to the gauge support and adjusting the filament mounts to bring the filament shadow images to a definite fixed position on the screen and artificially cooling the seal during the adjustment of the mount.

6. The method of locating filament mounts in lamp bulbs immediately following the sealing-in process so as to bear uniform relations to the bulb necks to which the bases are to be attached which consists in projecting a shadow image of each filament upon a screen and adjusting the mount while the seal is still hot so as to bring the shadow image within a prescribed area on the screen which bears a predetermined relation to the bulb neck and applying a cooling blast to the bulb necks during the adjustment of the mounts.

7. An apparatus for locating and fixing filament mounts with reference to the bulb necks including a stationary gauge support for the bulb neck, a screen removed from said support and an optical system including a light source and projecting lens disposed on opposite sides of said support for projecting shadow images of the filaments upon said screen.

8. An apparatus of the character set forth in claim 7 wherein the screen is removed a substantial distance optically from the lens with reflecting mirrors optically between the lens and the screen for directing the projected image upon the screen.

9. An apparatus of the character set forth in claim 7 including means for directing a cooling blast upon a bulb neck while carried by the gauge support.

10. An apparatus for checking and locating filaments with reference to the bulb necks, including a projecting lens, a light source disposed in the axis thereof, a screen disposed on the opposite side of the lens from the light source and a gauge support disposed between the lens and the light source which is adapted to engage the lamp bulb necks and support the bulbs with the filaments thereof approximately in the axial line of the projecting system.

11. An apparatus of the character set forth in claim 10 wherein the screen is optically removed from, but closely adjacent, the lens, and including a pair of mirrors arranged at an angle to one another, one of said mirrors being in axial line with the lens and the light source, and the other of said mirrors being in line with the screen.

12. In an apparatus for checking filament location of mounts with reference to the bulb necks of incandescent lamps, a closed casing, a projecting lens carried in one end wall thereof, a projecting screen also carried in said end wall adjacent said lens, a pair of reflecting mirrors arranged at an angle to each other and carried at the opposite end of said casing on the inside thereof, one of said mirrors being in axial line with the lens and the other being in line with said screen, an artificial light source also carried by said casing and disposed in the optical axis of said lens and a ring-like support for incandescent lamp bulbs disposed between said light source and said lens and adapted to receive the bulb necks with the filaments thereof approximately in the optical axis of the lens.

13. An apparatus of the character set forth in claim 12 including a guide disposed in line with the ring-like gauge support for the purpose set forth.

14. An apparatus of the character set forth in claim 12 wherein the lens, the mirrors, and the ring-like support are adjustable for the purpose set forth.

15. An apparatus of the character set forth in claim 7 including an alining guide spaced from and in line with the gauge support for engaging the bulb holder during the location of the filament.

16. In combination an apparatus for checking filament location in incandescent lamps during the sealing-in of the mounts including a fixed guide spaced from and disposed in alinement with a sealing-in-machine bulb holder when it comes to rest in the last position of the machine and adapted to engage and aline a removing holder with reference to a bulb when the removing holder is caused to engage the bulb, a stationary gauge support for the bulbs removed from said fixed guide, a guide alined with and spaced from the gauge support similarly to the aforesaid guide on the sealing-in machine, a screen removed from said gauge support, and an optical system including a light source and projecting lens for projecting shadow images of the filaments upon said screen.

In testimony whereof, I have signed my name to this specification.

CLYDE C. BOHNER.