

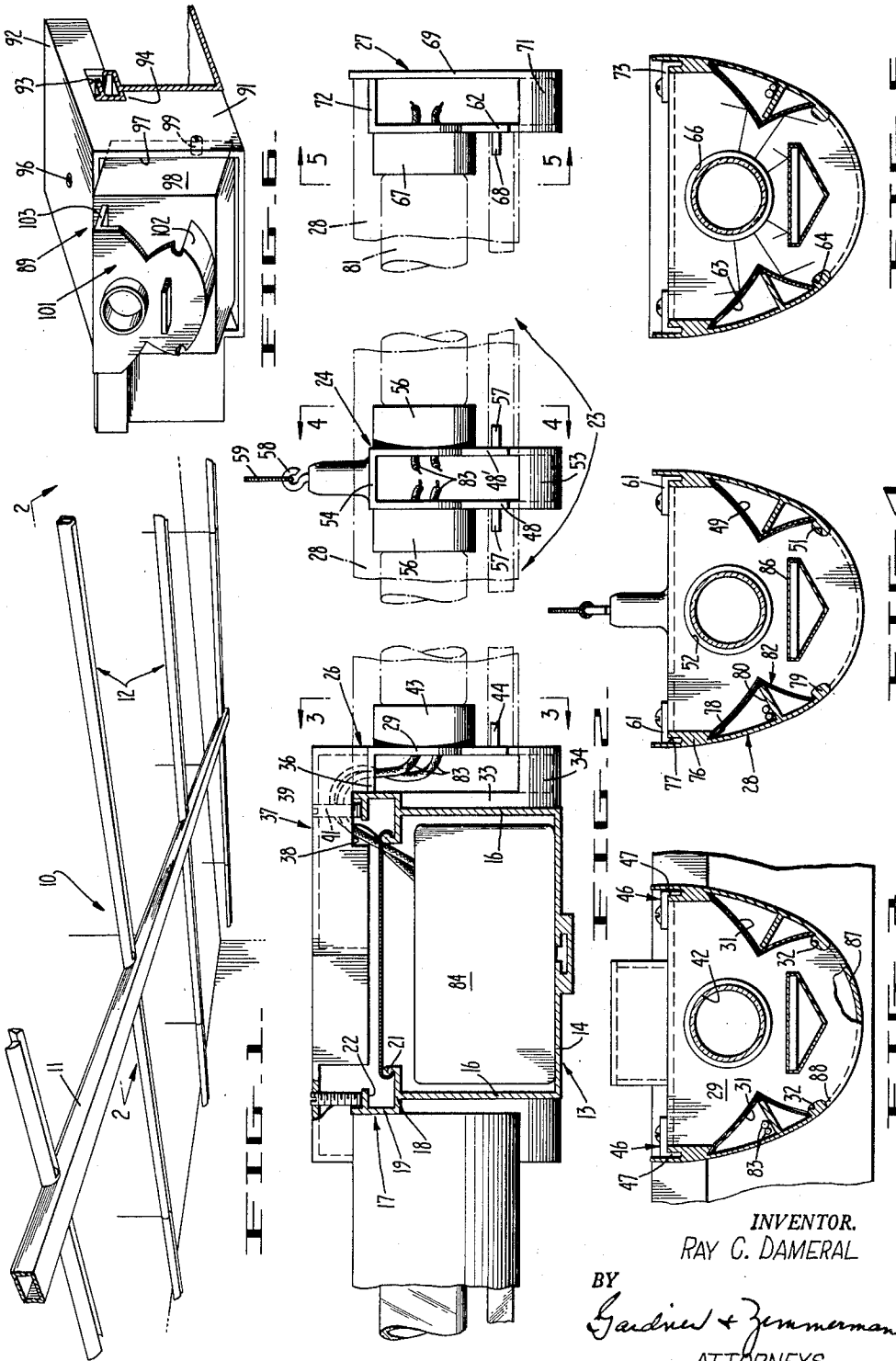
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R. C. DAMERAL

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FLUORESCENT LIGHTING UNIT

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INVENTOR.  
RAY C. DAMERAL

BY  
*Gardner + Zimmerman*  
ATTORNEYS

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## FLUORESCENT LIGHTING UNIT

Ray C. Dameral, Pleasant Hill, Calif., assignor to Herst Lighting Corporation, doing business as Peerless Electric Company, San Francisco, Calif., a corporation of California

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This invention relates to fluorescent lighting fixtures in general, and is particularly directed to fluorescent lamp units for employment with ballast housings in the construction of overhead lighting fixture systems for illuminating a large area.

One type of overhead fluorescent lighting fixture system for illuminating a large area is generally disclosed in my copending application for U.S. Letters Patent Serial No. 138,366, filed September 15, 1961, which matured into U.S. Patent No. 3,123,310, issued March 3, 1964, and which is particularly directed to a ballast housing for employment in such system. As disclosed in said application, the lighting system includes a continuous elongated ballast housing which is supported adjacent a ceiling and from the sides of which a number of parallel lamp housing units laterally project. The ballast housing is supported independently of the lamp units and the lamp units are preferably supported at one of their ends by the ballast housing and at other points along their lengths by stem hangers, suspension cables, or the like.

It will be appreciated that substantial flexibility is added to a lighting fixture system of the foregoing type where the lamp housing units may be readily constructed of any desired number of individual lamp housings in aligned end to end attachment.

It is therefore an object of the present invention to provide a lamp housing unit of modular construction which includes any desired number of individual housings and means for joining the housings together in aligned end to end attachment and supporting same to provide a unit.

Another object of the invention is the provision of a lamp housing unit of the class described which includes end joiner means to facilitate attachment of the unit to a continuous individually supported ballast housing in laterally projecting relation thereto.

It is still another object of the invention to provide a lamp housing unit of the class described wherein each of the lamp housings is arranged to produce an optimum amount of vertical illumination while materially reducing direct radiation and glare.

It is yet another object of the invention to provide lamp housing units of the class described which are readily adjustable to inclined positions relative to a ballast housing so as to parallel sloped ceilings.

A further object of the invention is to provide a modular lamp housing unit of relatively simple and economical construction.

The invention possesses other objects and features of advantage, some of which, with the foregoing, will be set forth in the following description of the preferred form of the invention which is illustrated in the drawing accompanying and forming part of the specification. It is to be understood, however, that variations in the showing made by the said drawing and description may be adopted within the scope of the invention as set forth in the claims.

FIGURE 1 is a perspective view of a lighting fixture system employing lamp housing units in accordance with the present invention.

FIGURE 2 is a sectional view taken at line 2-2 of FIGURE 1 illustrating particularly the various joiner members employed in the construction of the modular lamp housing units.

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FIGURE 3 is a sectional view taken at line 3-3 of FIGURE 2, illustrating particularly a joiner member which facilitates securance of the lamp housing units to a ballast housing.

FIGURE 4 is a sectional view taken at line 4-4 of FIGURE 2, illustrating particularly a combination joiner member and hanger which facilitates end to end attachment of two lamp housings.

FIGURE 5 is a sectional view taken at line 5-5 of FIGURE 2, illustrating particularly an end plate employed with the lamp housing unit.

FIGURE 6 is a partial perspective view of a modified form of ballast housing joiner member which may be employed in a lamp housing unit to facilitate inclined support thereof parallel to a sloped ceiling.

Referring now to FIGURE 1, there is shown a lighting fixture system 10 which includes a continuous elongated ballast housing 11 of the type disclosed in the previously referenced Patent No. 3,123,310 and a plurality of lamp housing units 12 in accordance with the present invention which project laterally from the ballast housing in longitudinally spaced parallel relationship.

Briefly, as best shown in FIGURE 2, the ballast housing 11 of the previously referenced patent application includes a channel member 13 having a base 14 and parallel spaced longitudinal side walls 16 each having a flange 17 along their upper edge of a unique configuration which facilitates attachment of the lamp housing units 12 thereto. Such flange 17 is of a substantially J-configuration with a base portion 18 in right angular relation to the side wall 16, an outer side wall portion 19 projecting upwardly from the outer edge of the base portion, and an inner side wall portion 21 projecting upwardly from the inner edge of the base portion and of lesser height than the outer side wall portion. The flange also includes a shelf portion 22 which projects right angularly inward from the outer side wall portion 19 at a position intermediate its height.

Considering now the lamp housing units 12 as to their preferred construction, it is of importance to note that they are of a modular nature. More particularly, each unit includes as many individual lamp housings 23 as desired connected in end to end alignment by means of intermediate lamp housing joiner and hanger members 24 with one of the housings at either end of the unit provided with a ballast housing joiner member 26 adapted to engage the ballast housing flanges 17. An end member 27 is provided at the opposite end of the unit from the joiner member 26. Longitudinal side members 28 extend between the various joiner members 24, 26 and end member 27 to form the respective housings 23 comprising the over-all unit.

The ballast housing joiner member 26 is provided with an outer end wall 29 of generally parabolic configuration having opposed cusp shaped notches 31 in its side edges. In addition, a curved notch 32 extends into each side edge from the lower outwardly flaring termination of each cusp notch. The joiner member 26 further includes an inner end wall 33 of substantially parabolic configuration conformed to outer end wall 29 and in parallel spaced relation thereto. The curved bottom portions of the inner and outer end walls are integrally interconnected by a conformed transversely curved longitudinally extending bottom wall 34. The upper horizontal edge of the inner end wall 33 is slightly downwardly spaced from that of the outer end wall 29 and the latter is provided with a pair of transversely spaced tabs 36 inwardly turned to terminate flush with the plane of the outer surface of the inner end wall. Intermediate the tabs 36 a downwardly opening generally cupped rectangular tongue 37 projects upwardly and inwardly from the outer end wall 29. The longitudinal side walls of the tongue

are provided with opposed rectangular notches 38 while the top wall thereof is provided with a tapped bore 39 transversely aligned with the notches 38 and having a set screw 41 or the like threadably engaging same. The outer end wall 29 is provided with an aperture 42 whose center is upwardly spaced from the apices of the cusp notches 31 and transversely intermediate same. An outwardly facing fluorescent lamp socket 43 is mounted in the aperture 42 while a rectangular horizontal shelf 44 projects outwardly from the outer end wall in underlying relation to the socket. The joiner member structure is completed by a pair of spring clips 45 which are secured to the tabs 35. The clips project transversely outward from the tabs and have downwardly turned lugs 47 spaced from the side edges of the end wall.

The ballast housing joiner members 26 constructed as just described are appropriately dimensioned to suitably engage the ballast housing flanges 17. The inner end wall 33 is arranged to abut the side wall of the ballast housing channel member 13 with the upper edges of the inner end wall engaging the under side of the base portion 18 of flange 17. The tabs 36 abut the outer side portion 19 of the flange and the notches 38 of tongue 37 engage the upper edge of this flange side portion. The screw 41 may be tightened against the shelf portion 22 of the flange to releasably secure the joiner member to the ballast housing.

Considering now the lamp housing joiner and hanger member 24, it is to be noted that same has a pair of end walls 48, 48' each having substantially the same configuration as the outer end wall 29 of ballast housing joiner member 26. More particularly each of the end walls 48 is generally parabolic and conformed to end wall 29, including cusp notches 49, curved notches 51 and aperture 52. The end walls 48, 48' are spaced apart and integrally interconnected at their curved lower edges by a conformed curved bottom wall 53 and at their upper edges by a horizontal top wall 54. Oppositely facing fluorescent lamp sockets 56 project longitudinally exteriorly from the apertures 52 in the respective end walls while shelves 57 project therefrom in similar fashion as the shelf 44 of joiner member 26. Centrally of the top wall 54 a hook 58 or the like projects upwardly to receive a suspension cable 59 or other hanging means. The member 24 is completed by spring clips 61 projecting transversely from top wall 54 in comparable fashion as the spring clips 45 of joiner member 26.

The end member 27 is substantially identical to joiner member 26 with the exception of the tongue 37. The member 27 comprises an inner end wall 62 of generally parabolic form which identically to the outer end wall 29 of joiner member 26 has cusp notches 63, curved notches 64, and an aperture 66. A fluorescent lamp socket 67 projects from aperture 66 and a horizontal shelf 68 projects from the end wall beneath the socket. A conformed parabolic outer end wall 69 is spaced from inner end wall 62 and integrally connected thereto by a curved bottom wall 71 and a top wall 72. Spring clips 73 project transversely from the top wall 72.

With the ballast housing joiner member 26, lamp housing joiner and hanger members 24, and end members 27 provided as just described, lamp housing units of varied lengths are readily constructed employing the foregoing members in different quantities and combinations. For example, one ballast, housing joiner member 26, one lamp housing joiner and hanger member 24, and one end member 27 may be employed as depicted in FIGURE 2 to construct a lamp housing unit 12 having two housings 23. In this regard a pair of the side members 23 which are transversely curved to conform to the upper peripheral side edge portions of the end walls of the various transverse members are secured longitudinally between members 24 and 26. The side members have inwardly projecting enlarged rim portions 76 adjacent their upper ends. The rims have vertical slots 77 in their upper sur-

faces and define V-notches 78 at their lower surfaces with the remainders of the side members. The side members further include inwardly projecting rounded lips 79 at their lower ends. A rib 80 projects inwardly from each side member intermediate the lip and rim for purposes subsequently described. The rim portion and lip of each side member enables it to be releasably secured to the members 24 and 26 in a highly expeditious manner. The lips 79 of the side members are engaged in the notches 32 and 51 of the ballast housing joiner member and lamp housing joiner member and the spring clips 46 and 61 thereof engage the slots 77. The side members are thus secured between the joiner members 24 and 26. In like fashion a pair of side members are secured between joiner member 24 and end member 27 to form a multihousing unit. Of course, a number of the housing joiner and hanger members 24 may as well be employed between the ballast housing joiner member 26 and end member 27 to provide a housing unit of longer length.

Fluorescent lamps 81 are inserted into the opposed sets of sockets of the respective members 24, 26 and 27. The side members 23 are opaque such that light emanating from the lamps is restricted to the vertical direction. In order that the vertical illumination be optimized, provision is made to reflect the light otherwise intercepted by the side members vertically from each lamp housing. More specifically, it is to be noted that the ribs 80 of the side members are positioned to extend to substantially the apices of the cusp notches, of the respective members while the V-notches 78 are adjacent the upper ends thereof. Reflectors 82 having a cusp cross section conformed to the cusp notches are hence readily secured in the housings by end engaging them in the notches and engaging their upper and lower edges respectively in the V-notches 78 and with the lips 79. The apices of the reflectors are backed by the ribs 80. It is particularly important to note that the reflectors 82 also serve to define enclosed wireways which extend between the various members of the lamp housing unit. Wires 83 may hence be led from the ballast units 84 within the ballast housing 11, through the cupped tongue 37 of member 26 to socket 43 and also through the various cusp notches of members 26, 24, and 27 and wireways defined by the reflectors 82 to the other sockets of the lamp unit.

A central reflector 86 is also readily secured in each housing by means of the shelves 44, 57 and 68. More particularly, the central reflectors are preferably of substantially isosceles triangular hollow cross section such that their opposite ends may be inserted over the shelves to retain the reflectors in the housings. When so secured within the housings the base surfaces of the central reflectors 86 directly underlie the lamps 81. Light is thus reflected vertically from the housings by the central reflectors 86 and side reflectors 82 as depicted by the phantom ray lines of FIGURE 5.

In some instances it is desirable that the light emanating from the lamp housings be diffused. To this end a curved diffuser 87 may be secured in closing relation to the lower portions of each housing as depicted in FIGURE 3. The diffuser is formed with upwardly and outwardly curved rims 88 along its side edges which are engageable with the lips 79 to secure the diffuser to the housing.

Where a building has sloped ceilings it is desirable that the lamp housing units 12 be inclined from the ballast housing 11 so as to parallel the ceiling. To this end a modified form of ballast housing joiner member 89 is provided as depicted in FIGURE 6. Such member includes a rectangular end portion 91 having a downwardly opening cupped tongue portion 92 projecting therefrom. The tongue portion is provided with rectangular notches 93 in its side walls to engage the upper edge of the outer side portion of one of the ballast housing flanges 17. Also the sides of the end portion 91 have lower projections 94 which engage the side of the bal-

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last housing and undersurface of the base portion of the flange. A set screw 96 extends through the top of the tongue 92 to engage the shelf portion 22 of the flange.

The end portion 91 of member 89 is rectangularly recessed as shown at 97 to receive a rectangular block 98. The block 98 is pivoted within the recess 97 as by means of pins 99 for rotation about a transverse axis. A substantially parabolic end wall 101 identical to end wall 29 of the ballast housing joiner member 26 and including the same elements mounted thereon is secured to the exterior face of block 98 in longitudinally spaced relation by an interconnecting curved lower wall 102 and horizontal upper wall 103. Thus the end wall 101 may be employed with side members 28, reflectors 32, 36 and the like in the construction of a lamp housing in the manner previously described relative to the other joiner member 26. However, since the block 98 upon which the end wall 101 is mounted is pivotal in the recess 97, the entire lamp housing unit employing the member 89 as an element may be inclined from the ballast housing to parallel a sloped ceiling.

There is thus provided by the present invention modular lamp housing units which can be constructed in varied lengths. The units may be end supported by the ballast housing 11 through employment of the ballast housing joiner member 26, and suspended from the ceiling at other positions along their lengths by the cables 59 secured to the hooks 58 of the lamp housing joiner and hanger members 24 included in the unit. Also where it is desired to incline the units from the ballast housing, the pivotal joiner members 89 may be employed in the units to connect them to the ballast housing.

What is claimed is:

1. A modular lamp housing unit comprising a ballast housing joiner member adapted for laterally outwardly facing attachment to a ballast housing and having a generally parabolic end wall, said end wall having opposed cusp shaped notches in the side edge portions thereof and curved notches at the lower terminations of said cusp shaped notches, at least one lamp housing joiner and hanger member having spaced end walls conformed to the end wall of said ballast housing joiner member, said spaced end walls integrally interconnected and having suspension means therebetween, an end member having an end wall conformed to that of said ballast housing joiner member, a plurality of longitudinally elongated curved side members engaging the opposite side edge portions of the respective end walls of said ballast housing joiner member, lamp housing joiner and hanger members, and end member and extending therebetween, said side members having inwardly turned rims adjacent their upper edges with vertical slots therein and defining V-notches adjacent the upper terminations of the cusp shaped notches in said end walls, said side members having inwardly turned rounded lips adjacent their bottom edges engaging the curved notches of said walls, said side members having inwardly projecting ribs intermediate said rims and lips terminating adjacent the apices of said cusp shaped notches, a plurality of spring clips projecting transversely from said ballast housing joiner member, said lamp housing joiner and hanger members, and said end member into engagement with the rim slots of said side members, cusp shaped side reflectors extending longitudinally between said ballast housing joiner member, lamp housing joiner and hanger members, and end member, said reflectors end engaging the cusp shaped notches of said end walls, the upper edges of said reflectors engaging the V-notches of said side members, the lower edges of said reflectors engaging the lips of said side members, the apices of said reflectors being engaged by the ribs of said side members, fluorescent lamp sockets secured to said end walls, and central reflectors secured to and extending longitudinally between said end walls in underlying relation to said sockets.

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2. A modular lamp housing unit according to claim 1, further defined by said ballast housing joiner member including an end portion adapted for laterally outwardly facing attachment to a ballast housing, and the parabolic end wall of said ballast housing joiner member being pivotally mounted upon said end portion for rotation about a horizontal axis normal to the lateral direction.

3. In a lighting fixture system the combination comprising a continuous elongated ballast housing of generally channel configuration including a base and upwardly projecting parallel side walls, said side walls having flanges along their upper edges of substantially J-shaped configuration in transverse cross section each including a base portion in right angular relation to the side wall with an outer side portion projecting upwardly from the outer edge of the base portion and a shelf portion projecting inwardly from the outer side portion intermediate its height, a plurality of ballast housing joiner members each having an outer parabolic end wall and a conformed inner end wall spaced therefrom and integrally connected thereto, each joiner member having a tongue portion projecting from the upper edge of the outer end wall thereof, said joiner members disposed with their tongues transversely engaging the upper edges of the outer side portions of said flanges at longitudinally spaced positions therealong and their inner end walls abutting the sides of said ballast housing and engaging the undersurfaces of the base portions of said flanges, threaded fasteners extending through the tops of said tongue portions and engaging the shelf portions of said flanges, lamp housing joiner and hanger members laterally spaced from said ballast housing joiner members and having a pair of opposed end walls conformed to the outer end walls of the ballast housing joiner members with suspension means carried therebetween, end members laterally spaced from said lamp housing joiner and hanger members and having end walls conformed to the outer end walls of said ballast housing joiner members, and pluralities of pairs of side members secured between side edge portions of the end walls of said ballast housing joiner members, lamp housing joiner and hanger members, and end members.

4. In a lighting fixture system according to claim 3, the combination further defined by side reflectors secured to and extending between the end walls of said ballast housing joiner members, lamp housing joiner and hanger members, and end members adjacent said side members, and by central reflectors secured to and extending between said end walls intermediate said side reflectors.

5. In a lighting fixture system the combination comprising a continuous elongated ballast housing of generally channel configuration including a base and upwardly projecting parallel side walls, said side walls having flanges along their upper edges of substantially J-shaped configuration in transverse cross section each including a base portion in right angular relation to the side wall with an outer side portion projecting upwardly from the outer edge of the base portion and a shelf portion projecting inwardly from the outer side portion intermediate its height, and a plurality of ballast housing joiner members each having an inner end wall portion with lower projections and a tongue projecting from its upper edge, the tongues transversely engaging the upper edges of the outer side portions of said flanges at longitudinally spaced points therealong and the projections abutting the side walls of said ballast housing and engaging the undersides of the base portions of said flanges, said ballast housing joiner members having threaded fasteners extending through the tops of the tongues and engaging the shelf portions of said flanges, said ballast housing joiner members each having an outer end wall portion adapted for attachment to a lamp housing pivotally mounted upon the inner end wall portion of the joiner member for rotation about an axis parallel to the length of said ballast housing.

6. A modular lamp housing unit comprising a ballast

housing joiner member adapted for laterally outwardly facing attachment to a ballast housing and having an end wall with a pair of notches provided respectively on opposed side edges thereof, an end member having an end wall substantially conformed to that of said ballast housing joiner member and disposed in spaced parallel relationship therewith, at least one intermediate joiner member having a pair of spaced walls each substantially conformed to said end walls and disposed intermediate said end walls in spaced parallel relationship therewith, suspension means mounted on said intermediate joiner member, a pair of elongated spaced side members extending longitudinally between said ballast housing joiner member and said intermediate joiner member and engaging the opposed side edges of the confronting walls of said ballast housing joiner member and intermediate joiner member, a second pair of elongated spaced side members extending longitudinally between said intermediate joiner member and said end member and engaging the opposed side edges of the confronting walls of said intermediate joiner member and said end member, said side members each having an inwardly turned lip adjacent one edge thereof for selectively removably engaging

said notches of said walls, said side members having rims adjacent their other edges each provided with slots, a plurality of clips projecting from said joiner members and end member for selectively removable engagement with said slots, a plurality of elongated side reflector members each secured adjacent one of said side members substantially coterminous therewith and having a portion spaced inwardly from said side member to define an elongated passageway extending between said spaced walls, and lamp sockets secured to said end walls.

7. The combination of claim 6 further defined by said reflectors each being cusp shaped and having its edges engaging and secured between the spaced rim and lip of each side member.

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NORTON ANSHER, *Primary Examiner.*

GEORGE NINAS, JR., *Examiner.*