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DUCT AND CHOKE COIL FOR FLUORESCENT LIGHTING UNITS

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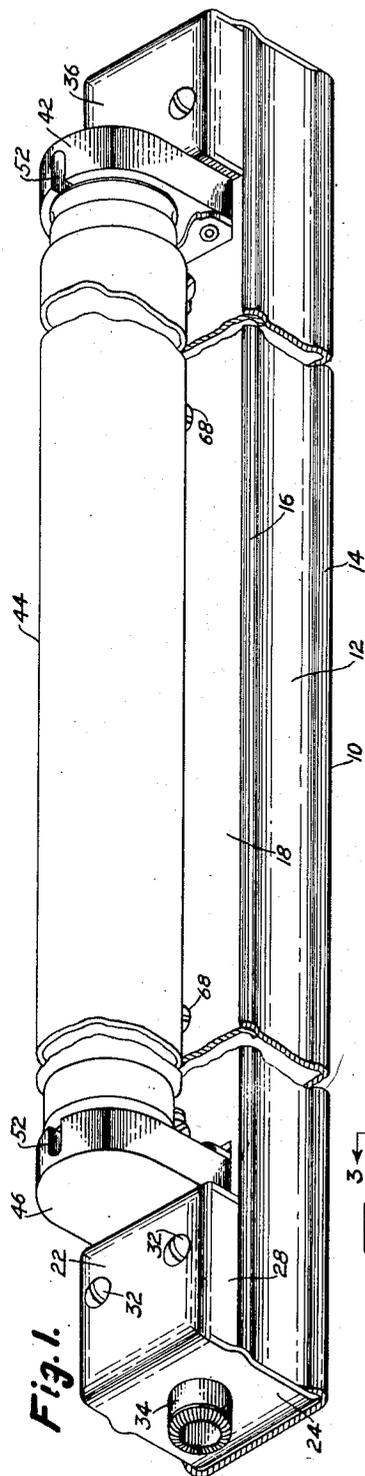


Fig. 1.

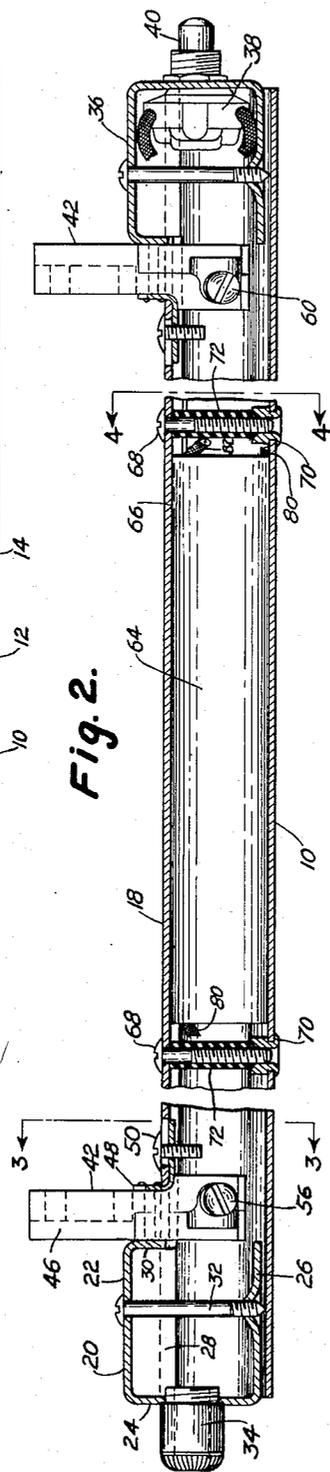


Fig. 2.

Fig. 3.

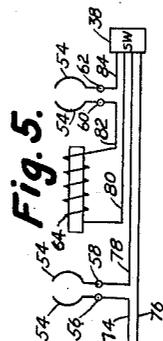


Fig. 4.

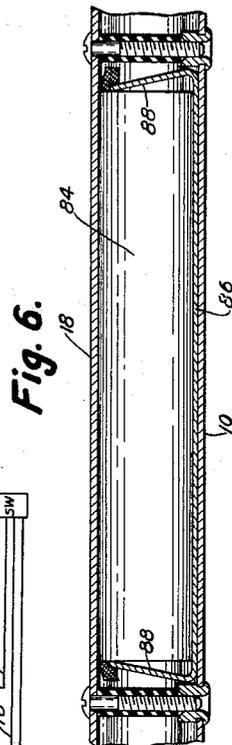


Fig. 5.

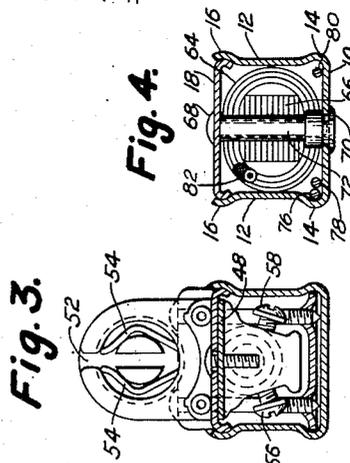
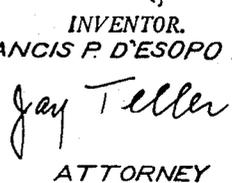


Fig. 6.



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DUCT AND CHOKE COIL FOR FLUORESCENT LIGHTING UNITS

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1, The invention relates particularly to the choke or ballast coil of a fluorescent lighting unit and to the relationship thereof with other parts.

One of the objects of the invention is to provide a fluorescent lighting unit having a longitudinal wire conduit or duct which carries the holders for the lamp tube and having a choke or ballast coil closely fitting the duct so as to be directly supported thereby without the use of any separate coil supporting member.

Another object of the invention is to provide a fluorescent lighting unit of the character above described wherein the coil is of the open-ended type and wherein the walls of the conduit constitute the sole external metallic magnetic path for the coil.

Still another object of the invention is to provide a fluorescent lighting unit of the character above described wherein the coil is of the open-ended type, wherein the walls of the conduit constitute an external metallic magnetic path for the coil, and wherein there is a supplemental yoke associated with the coil within the duct and constituting an auxiliary external metallic magnetic path for the coil.

Other objects of the invention will be apparent from the drawing and from the following specification and claims.

In the drawing I have shown two alternative embodiments of the invention, but it will be understood that various changes may be made from the constructions shown, and that the drawing is not to be construed as defining or limiting the scope of the invention, the claims forming a part of this specification being relied upon for that purpose.

Of the drawing,

Fig. 1 is a perspective view of a lighting unit embodying the invention, the wiring being omitted.

Fig. 2 is a longitudinal central sectional view of the unit shown in Fig. 1 but with the fluorescent lighting tube and the major portion of the wiring omitted.

Fig. 3 is a transverse sectional view taken along the line 3-3 of Fig. 2.

Fig. 4 is a transverse sectional view taken along the line 4-4 of Fig. 2, but showing some of the wiring.

Fig. 5 is a diagram of wiring connections.

Fig. 6 is a view similar to the central portion of Fig. 2 but showing an alternative embodiment of the invention.

Referring to the drawing, particularly Figs. 1 to 5 thereof, **10** is a channel shaped conduit or

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duct body which may conveniently be of a standard shape such as is commonly used for electric wiring conduits or ducts. While the shape of the duct body **10** may be varied, it is preferably generally rectangular and it comprises a rear wall and two similar side walls **12, 12**, each of which is provided at or near the rear with an outwardly convex or inwardly concave longitudinal bead **14**, and each of which is provided at or near the front with an outwardly convex or inwardly concave longitudinal bead **16**. The central portion of the duct body **10** is closed at the front by a suitable cover **18** which is preferably flat. When the duct **10** is provided with beads such as **16, 16**, the cover **18** is preferably so formed that it can be snapped into the beads **16, 16** in engagement with the inner concave surfaces thereof, as shown in Figs. 3 and 4.

At one end of the duct body **10**, that is, at the left end, as shown in the drawing, there is provided an end closing member **20**. This member is generally U-shaped in longitudinal section to provide a front wall **22**, an end wall **24** and a rear wall **26**. The width of the member **20** is such that the rear wall **26** thereof can extend into and approximately fit the interior concave faces of the beads **14, 14** so that the member is held against movement in the forward direction. Formed integrally with the front wall **22** are lateral flanges which are adapted to extend into the conduit between the side walls thereof. The front wall **22** preferably also has a transverse flange **30** adjacent its inner end. The end member **20** is held in place by means of screws **32, 32** which extend through unthreaded apertures in the front wall **22** and through threaded apertures in the rear wall **26** into engagement with the rear wall of the conduit. By turning the screws the rear wall **26** of the end member can be forced forwardly. The engagement of the screws with the rear walls of the duct and the engagement of the edges of the walls **26** with the walls of the beads **14, 14** serves to lock the end member in place. The end wall **24** is apertured and carries an insulating bushing **34** through which wires can extend into the duct.

The duct body is provided at the opposite end with an end closing member **36** which is or may be identical in construction with the member **20**. Repetition of the detailed description is unnecessary. Mounted within the end member **36** is a switch **38** having a push button **40** which projects outward through an aperture in the end wall. The switch **38** may be of standard con-

struction and constitutes no part of the invention.

Two holders 42, 42 are provided at the front of the duct for receiving and engaging the terminal pins at the respective ends of a fluorescent lighting tube 44. The tube 44 is of standard construction and a detailed description is unnecessary. Each holder 42, 42 comprises a body 46 of insulating material to which is connected an L-shaped mounting bracket 48. A screw 50 extends through a longitudinal slot in the front cover 18 and into the bracket 48, this screw thus serving to secure the holder in place on the cover. The slot in the cover permits minor longitudinal adjustments of the holder with respect to the cover to compensate for minor variations in the length of the duct body 10. The body 46 of each holder is slotted at the front, as indicated at 52, to admit the terminal pins on the tube 44 into an open-ended recess. Positioned in the recess are flexible contacts 54, 54 which are connected respectively with wire terminals positioned within the duct body 10. The wire terminals at the left are designated 56 and 58 and those at the right are designated 60 and 62. After the terminal pins of the tube have been introduced through the slots 52 into the recess in the two holders, the tube is turned through 90° to bring the terminal pins thereof into firm engagement with the contacts 54, 54.

In accordance with usual practice in fluorescent lighting units, a choke or ballast coil is provided, but the coil is of the open-ended type and not of the conventional closed-ended type. As shown, the coil comprises a winding 64 which surrounds a laminated core 66. The ends of the core 66 are exposed and the coil does not have any self-contained external metallic magnetic path. In accordance with the invention, the choke or ballast coil is of such size and shape that it can be located entirely within the duct 10 and behind the cover 18 thereof, as clearly indicated in Fig. 4. The choke coil is shorter than the duct and is located entirely within it and between the ends thereof. The said coil is positioned approximately at the lengthwise center of the duct body 10 and is positioned between two transverse screws 68, 68 which extend through holes in the front cover 18 and into bushings 70, 70 secured to the rear wall of the duct 10. The screws 68, 68 are preferably provided with insulating sleeves 72, 72.

The choke or ballast coil preferably engages directly with the walls of the duct body and cover without any separate means for securing it against forward or lateral movement. It is freely insertable in or removable from the channel-shaped body of the duct when the cover is not in place. The coil is of such size that it engages at least three sides or walls of the duct, and as shown in Figs. 1 to 4, it engages four sides or walls thereof. The removable cover 18 constitutes one of the walls that are engaged by the coil. The cross sectional shape of the coil is different from that of the conduit so that longitudinal wire spaces are provided between the coil and portions of the conduit walls. When the conduit is rectangular, the longitudinal wire spaces are at the corners of the duct as shown clearly in Fig. 4.

The choke or ballast coil functions in the manner common in fluorescent lighting units, and it may be connected in circuit with the lamp tube and with the switch as shown in Fig. 5. Two wires 74 and 76 in the form of a cord are led in

through the insulating bushing 34. The wire 74 is connected with the wire terminal 56 and the wire 76 is connected with the switch 38. The terminal 58 is connected by a wire 78 with the switch 38. Wires 80 and 82 connect the ends of the choke coil respectively with the switch 38 and with the wire terminal 60. The wire terminal 62 is connected by means of a wire 84 with the switch 38. As already stated, the choke coil is located within the duct 10 and it will be understood that all of the wires above-referred to are also located within the duct. The wires extend to the extent necessary through the described longitudinal wire spaces between the coil and the immediately adjacent walls or corners of the duct.

The walls of the duct body 10 are formed at least in part of magnetic metal and it will be seen that the coil is so positioned within the duct that the duct walls form an external metallic magnetic path for the coil. In fact, as shown in Figs. 1 to 4, the said walls constitute the sole external metallic magnetic path for the coil. The utilization of the walls of the duct as the external magnetic path for the coil reduces costs and conserves space. Inasmuch as there is no separate support for the coil, the coil may be of the maximum size that can fit within the conduit.

While I ordinarily prefer to utilize the walls of the conduit as the sole external metallic magnetic path for the coil, it may under some circumstances be desirable to provide means forming an auxiliary metallic magnetic path, at the same time retaining the simplicity of construction wherein the coil is supported directly by the conduit walls without any separate supporting means for preventing transverse movement. Fig. 6 shows a construction which is or may be identical with that shown in Figs. 1 to 4 except that there is provided a slightly smaller coil 84 with which is associated a thin flat yoke 86 extending longitudinally and positioned between the coil and one wall of the duct, as for instance the rear wall. The yoke 86 preferably has transversely extending flanges 88, 88 which are positioned adjacent the ends of the coil. The yoke 86 is formed of a suitable magnetic metal such as silicon steel and it provides an auxiliary metallic magnetic path between the ends of the coil 84.

What I claim is:

1. For use in a fluorescent lighting unit, the combination of an enclosed duct formed of magnetic metal and including a longitudinal channel-shaped body and a detachable longitudinal front cover therefor, a longitudinal open-ended choke or ballast coil shorter than the duct and located entirely within it and spaced from the ends thereof, the said coil directly engaging at its sides and rear with the side and rear walls of the duct body and directly engaging at its front with the front cover wall so that the said duct walls constitute the sole external metallic magnetic path for the coil.

2. For use in a fluorescent lighting unit, the combination of an enclosed duct having at least a portion of its walls of magnetic metal from end to end and including a longitudinal channel-shaped body and a detachable longitudinal front cover therefor, a longitudinal open-ended choke or ballast coil shorter than the duct and located entirely within it and spaced from the ends thereof, the said coil being freely insertable or removable from the channel-shaped body when the cover is not in place and the said coil directly engaging at its sides and rear with the side and

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rear walls of the duct body and directly engaging at its front with the front cover wall when the cover is in place so that the said duct walls hold the coil against relative transverse movement in any direction and so that the portion of the said walls formed of magnetic metal constitute the sole external metallic magnetic path for the coil.

3. For use in a fluorescent lighting unit, the combination of an enclosed duct formed of magnetic metal and including a longitudinal channel-shaped body and a detachable longitudinal front cover therefor, a longitudinal open-ended choke or ballast coil shorter than the duct and located entirely within it and spaced from the ends thereof, the said coil directly engaging at its sides and rear with the side and rear walls of the duct body and directly engaging at its front with the front cover wall so that the said duct walls constitute the sole external metallic magnetic path for the coil, the said coil having a cross sectional shape different from that of the duct to provide longitudinal wire spaces between the said coil and the immediately adjacent longitudinal duct walls, and longitudinal wires within the duct and connected with the coil, some of which longitudinal wires are located in the said longitudinal wire spaces.

4. For use in a fluorescent lighting unit, the combination of an enclosed duct having at least a portion of its walls formed of magnetic metal from end to end and including a longitudinal channel-shaped body and a detachable longitudinal front cover therefor, a longitudinal open-ended choke or ballast coil shorter than the duct and located entirely within it and spaced from the ends thereof, the said coil being positioned immediately adjacent the duct walls so that the said walls constitute an external metallic magnetic path for the coil, the said coil being freely insertable in or removable from the channel-shaped body of the duct when the cover is not in place and the said coil having such transverse cross sectional size and shape that it directly engages the longitudinal walls of the duct body and cover when the cover is in place so as to be held by the said walls against lateral or forward movement.

5. For use in a fluorescent lighting unit, the combination of an enclosed duct formed of magnetic metal and including a longitudinal channel-shaped body and a detachable longitudinal front cover therefor, a longitudinal open-ended choke or ballast coil shorter than the duct and located entirely within it and spaced from the ends thereof, the said coil being positioned immediately adjacent the duct walls so that the said walls constitute an external metallic magnetic path for the coil, the said coil being freely insertable in or removable from the channel-shaped body of the duct when the cover is not in place and the said coil having such transverse cross sectional size and shape that it directly engages the longitudinal walls of the duct body and cover when the cover is in place so as to be held by the said walls against lateral or forward movement and the said coil further having a transverse cross sectional shape different from that of the duct to provide longitudinal wire spaces between the said coil and portions of the immediately adjacent longitudinal duct walls,

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and longitudinal wires within the duct and connected with the coil some of which longitudinal wires are located in the said longitudinal wire spaces.

6. For use in a fluorescent lighting unit, the combination of an enclosed duct including a longitudinal channel-shaped body and a detachable longitudinal front cover therefor, a longitudinal open-ended choke or ballast coil shorter than the duct and located entirely within it and spaced from the ends thereof, and a longitudinally extending yoke formed of magnetic metal and extending from end to end of the coil at the rear thereof and in engagement with the rear wall of the duct body, the said coil and yoke being freely insertable in or removable from the channel-shaped body of the duct when the cover is not in place and the said coil having such transverse cross sectional shape and size that it engages at its rear with the yoke and at its sides with the side walls of the duct body and at its front with the front cover wall when the cover is in place so as to be held by the said yoke and duct walls against relative transverse movement in any direction.

7. For use in a fluorescent lighting unit, the combination of an enclosed duct formed of magnetic metal including a longitudinal channel-shaped body and a detachable longitudinal front cover therefor, a longitudinal open-ended choke or ballast coil shorter than the duct and located entirely within it and spaced from the ends thereof, the said coil being positioned immediately adjacent the duct walls so that the said walls constitute an external metallic magnetic path for the coil, and a longitudinally extending yoke formed of magnetic metal and extending from end to end of the coil at the rear thereof and in engagement with the rear wall of the duct body which yoke provides an additional external metallic magnetic path for the said coil, the said coil and yoke being freely insertable in or removable from the channel-shaped body of the duct when the cover is not in place and the said coil having such transverse cross sectional shape and size that it engages at its rear with the yoke and at its sides with the side walls of the duct body and at its front with the front cover wall when the cover is in place so as to be held by the said yoke and duct walls against relative transverse movement in any direction.

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