Oct. 4, 1949. J. R. MAZZOLA 2,483,919

COIL AND CONDENSER ASSEMBLY

Filed May 29, 1948 2 Sheets-Sheet 1

Fig. 1.

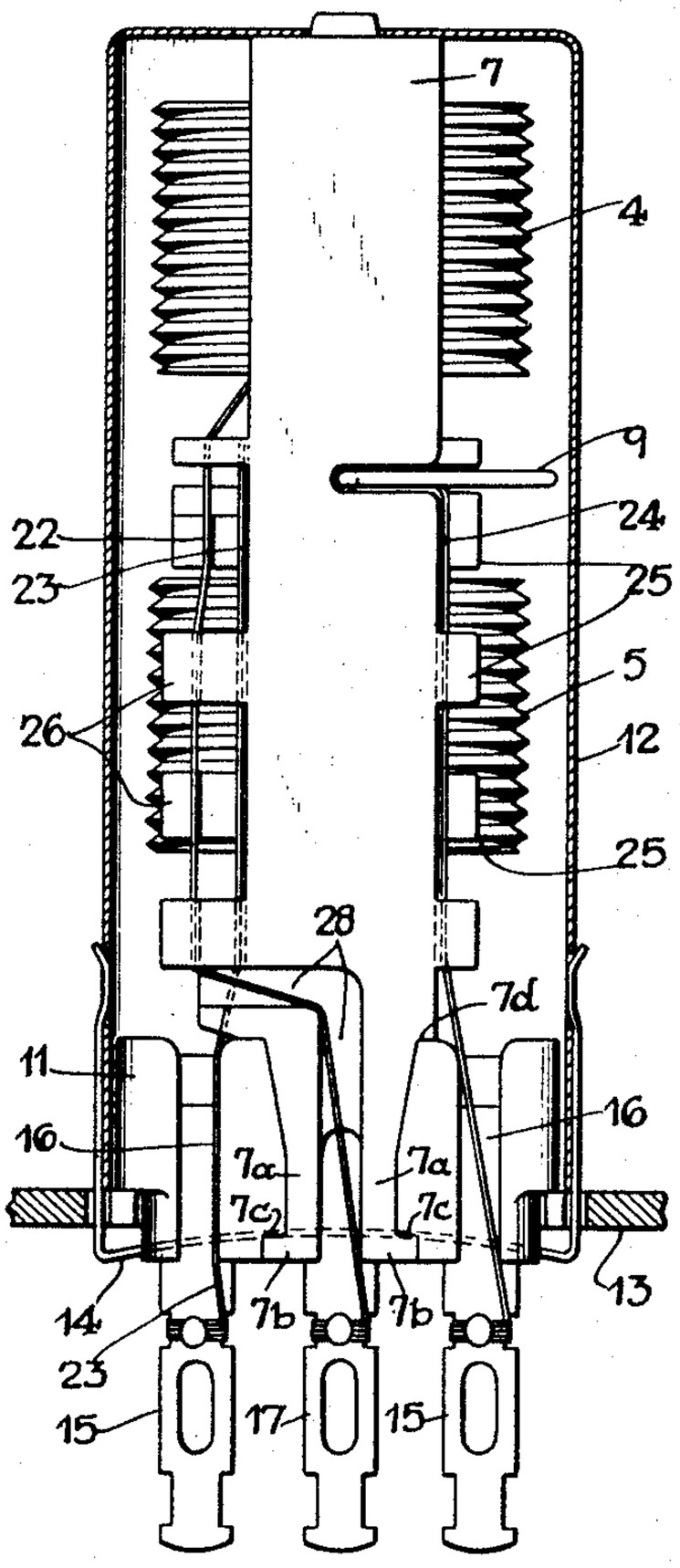
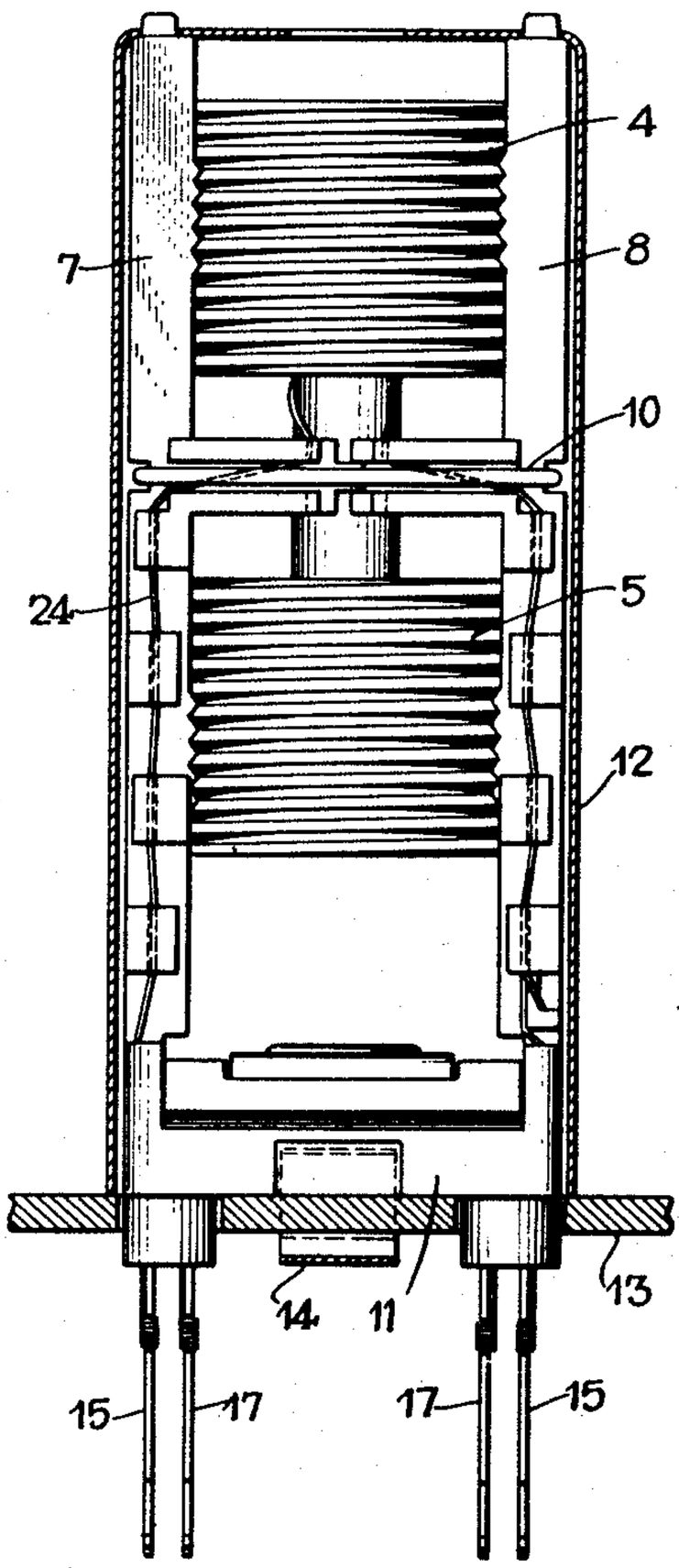


Fig. 2.



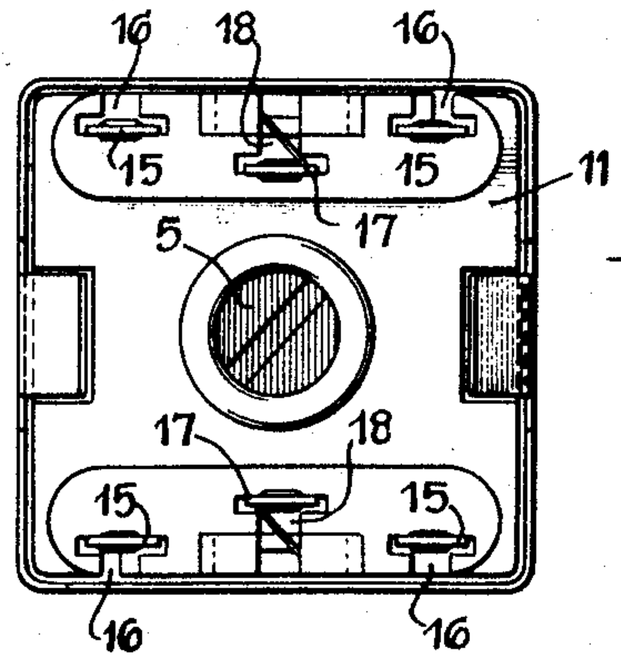


Fig. 3.

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Fig. 4.

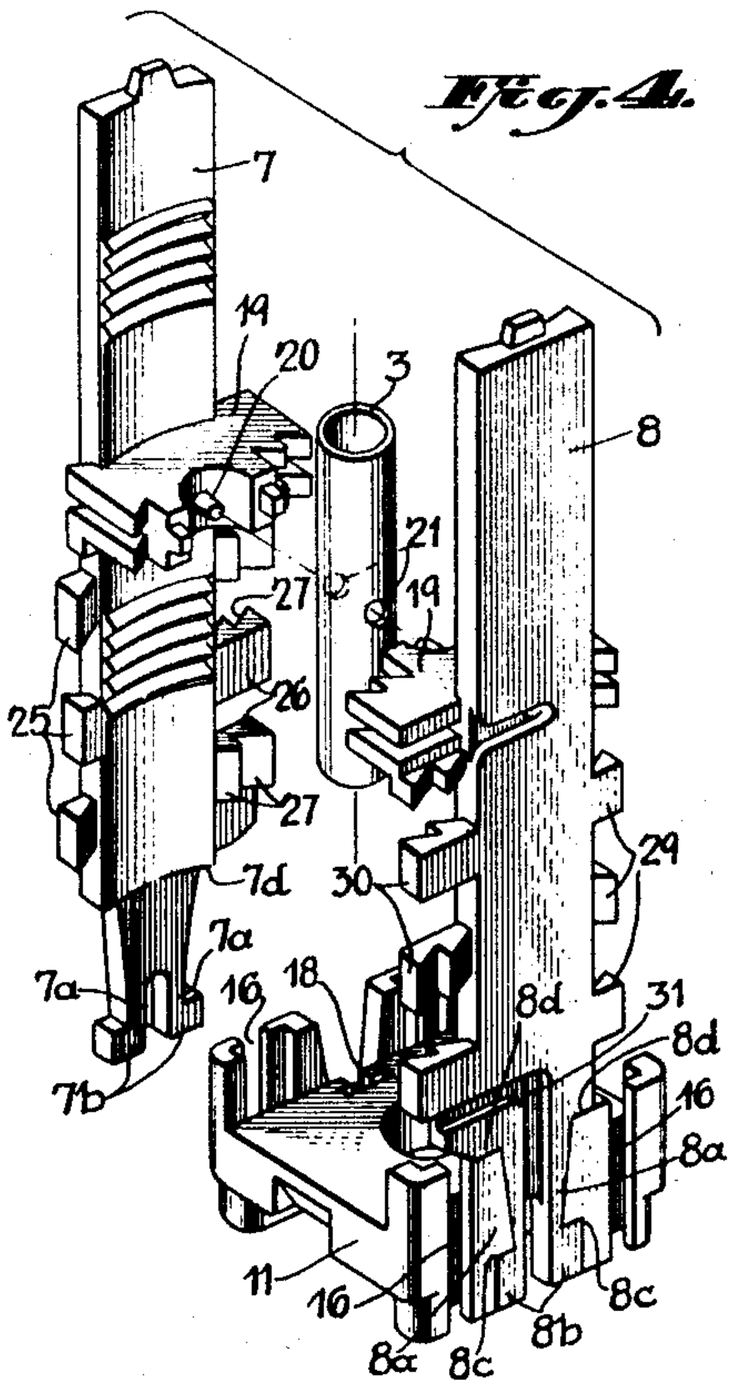


Fig. 5.

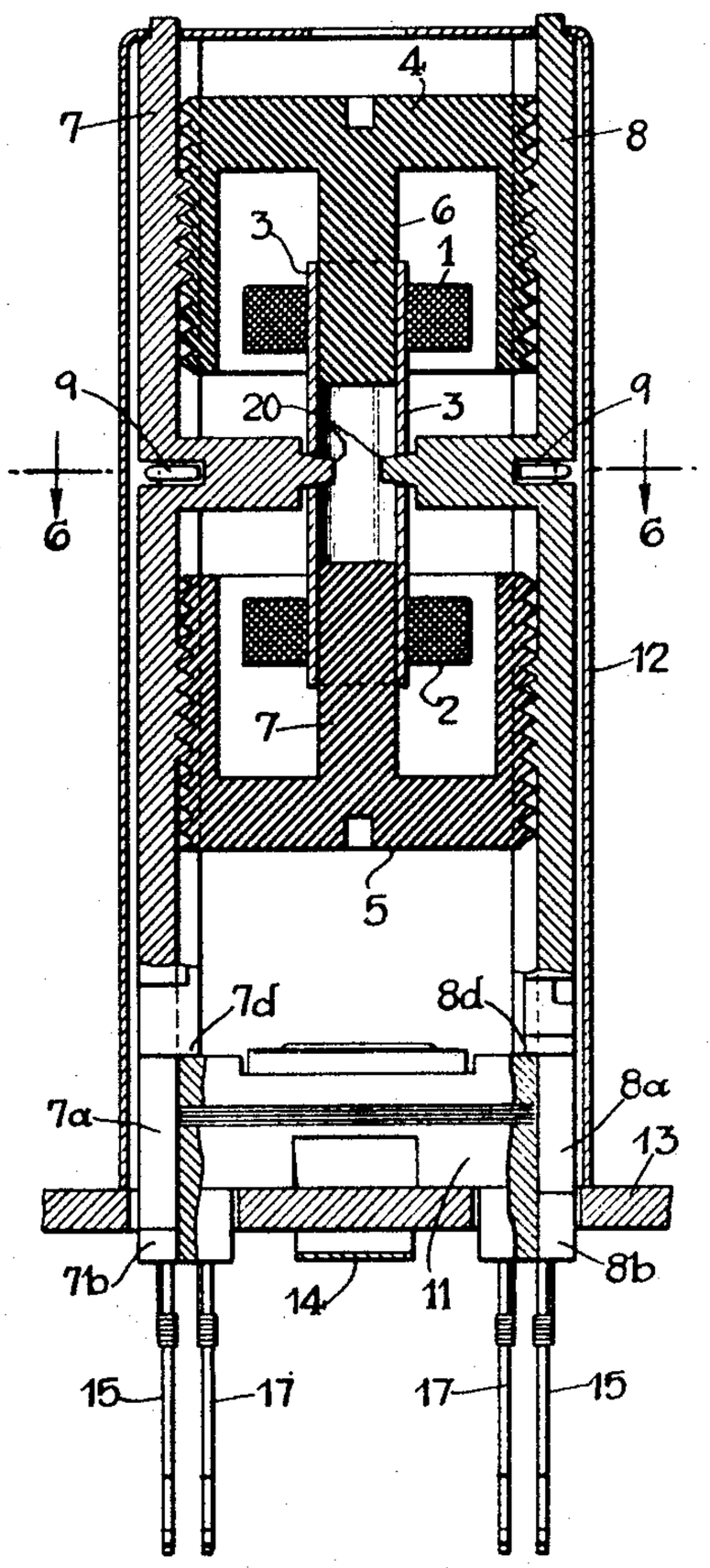


Fig. 6.

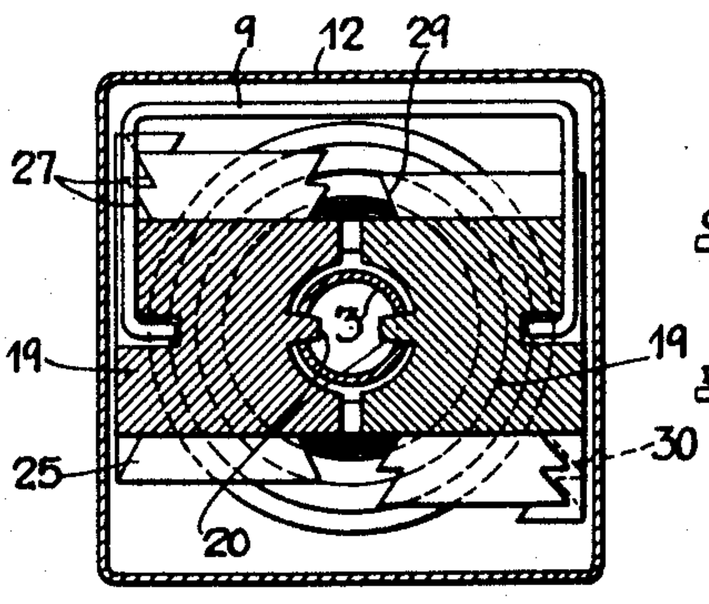


Fig. 7.

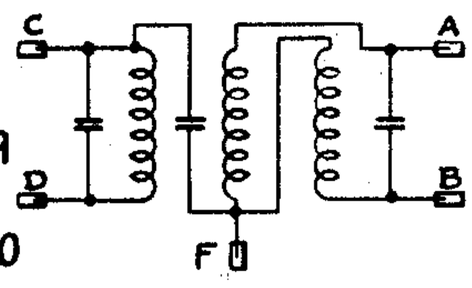
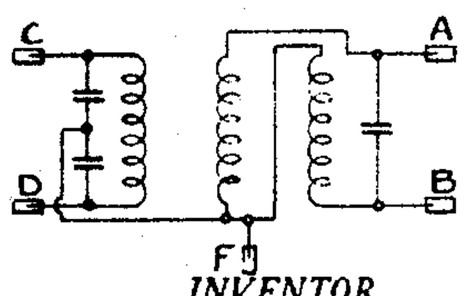


Fig. 8.



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Patented Oct. 4, 1949

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UNITED STATES PATENT OFFICE

2,483,919

COIL AND CONDENSER ASSEMBLY

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Application May 29, 1948, Serial No. 29,979

7 Claims. (Cl. 171—242)

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The invention relates to coil and condenser assemblies of the general type shown in the United States Patent to L. G. Ketcham No. 2,435,630 issued February 10, 1948. In one of its aspects the invention aims to provide a supporting frame structure for coils and condensers of the character shown in the Ketcham patent, wherein the main coil and condenser supporting parts may be more readily assembled into and held in proper cooperative relationship and disassembled from such relationship. In another aspect when applied to assemblies having adjustable cores of the character shown in the Ketcham patent, the invention aims to provide a supporting structure which will better equalize and distribute between the cores, the frictional pressure applied by the frame pieces which is relied upon to hold the cores in adjusted position. In another aspect the invention relates to a frame structure of the above character wherein effective provision is made for multiple terminal connections leading from the coils to the terminals of the assembly, in such manner as to facilitate various coil and condenser hook-ups as may be needed to satisfy different special circuit requirements.

Further objects and advantages of the invention will be in part obvious and in part specifically referred to in the description hereinafter contained which, taken in connection with the accompanying drawings, discloses a preferred form of coil and condenser assembly constructed in accordance with the invention; the disclosure however should be considered as merely illustrative of the invention in its broader aspects. In the drawings—

Fig. 1 is a side view, partially in section, of a coil and condenser assembly constructed in accordance with the invention.

Fig. 2 is a side view similar to Fig. 1 but taken at right angles thereto.

Fig. 3 is a bottom plan of the assembly shown in Fig. 1.

Fig. 4 is an exploded perspective view showing partly disassembled, frame pieces and a condenser supporting block which constitute parts of the assembly shown in Figs. 1 to 3.

Fig. 5 is a central longitudinal sectional view of the assembly shown in Figs. 1 to 3, but with certain parts of the condenser supporting block cut away.

Fig. 6 is a section on line 6—6 of Fig. 5, looking in the direction of the arrows.

Figs. 7 and 8 are schematic diagrams indicating certain coil and condenser hookups to which

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the assembly shown in the previous figures is appropriate.

The invention is illustrated as applied to an assembly wherein the coils 1 and 2 (Fig.5), are axially alined upon and carried by a tubular coil form 3. Shell cores 4 and 5 respectively have central hubs 6 and 7 fitting adjustably within the coil form 3, and serve the coils 1 and 2 respectively; as hereinafter described in greater detail, the cores 4 and 5 hold the coil form and coil structure against transverse movements.

Frame pieces 7 and 8 which will usually be made of molded plastic, extend longitudinally of the coils and cores on opposite sides thereof and frictionally engage the surfaces of the cores to hold the latter in adjusted position, the frame pieces being shown as resiliently clamped against the cores by a spring clip 9. To facilitate axial adjustment of the cores with respect to the coils, the cylindrical peripheries of the cores are shown as provided with screw threads which engage with complementary screw threaded portions on the frame pieces 7 and 8, so that the axial positions of the cores may be readily adjusted by inserting a screw-driver through either end of the assembly and turning the cores until they assume the desired position.

The condenser unit of the assembly is mounted upon a block 11 which will usually be of molded plastic, and which extends transversely between adjacent end portions of the frame pieces 7 and 8, so as to lie across the mouth of the housing 12 which encloses the assembly, and which housing will usually be of the character disclosed in the U. S. patent to Ketcham No. 2,429,468 and held in place with respect to a chassis 13 by a spring clip 14 of the character shown in said last mentioned Ketcham patent. The condenser carried by the insulating block 11 is preferably of the multi-unit type disclosed in my copending application Serial Number 24,620 filed May 1, 1948 entitled "Condenser and coil assembly" and will not be specifically described herein, it being sufficient for present purposes to note that the insulating block 11 is shown as having four terminal strips 15 projecting therefrom, which are received in grooves 16 (Figs. 1, 3 and 4) respectively near the corners of block 11, and is also shown as having further terminal strips 17 (Fig. 3) projecting therefrom which are positioned in the intermediate portions of opposite sides of block 11, between the respectively adjacent terminal strips 15, these terminal strips 17 being received in grooves 18 extending along opposite sides of the block 11.

To facilitate the proper assembly and disassembly of the parts, the frame pieces 7 and 8 and the condenser supporting block 11 are provided with detachable interlocking projections and recesses which fix the positions longitudinally of the assembly, of the frame pieces with respect to block 11 and therefore with respect to each other, in such manner that the frame piece 8 for example may be readily laid down to act as a base, so to speak, to which the block 11 is then attached; then the coils and cores are placed upon the frame piece 8, and the frame piece 7 is then engaged with block 11 on top of the coils and cores, whereupon the above mentioned interlocking engagement between the side pieces and block 11 will bring all of the above mentioned parts necessarily into proper cooperative relationship to each other. The spring clip 9 will then be applied to hold the parts in position. For the above purposes the end portion of the frame piece 8 is shown as provided with tongues 8*a* (Fig. 4) which overlap the adjacent side wall of condenser supporting block 11 and are provided with heads 8*b* which lock behind shoulders 8c provided by complementary recesses in the corresponding side wall of block 11, shoulders 8*d* (Fig. 4) on the frame piece 8 also seating against block 11. Preferably the fit between the above mentioned parts is in the nature of a frictional force fit, to avoid accidental displacement of the block 11 during the assembly operations above mentioned. The frame piece 7 is likewise shown as provided with tongues 7*a* (Figs. 1 and 4) having heads 7*b*, and shoulders 7*d* respectively similar to the parts 8*a*. 8*b* and 8*d* above described, and cooperating with shoulders 7c (Fig. 1) similar to the shoulders 8c above described. It should be noted however, as indicated in Fig. 4, that the above mentioned interengaging parts preferably are not identical on the opposite sides of the assembly, the heads 7*b* being shown as shorter in length than the heads 8*b*; in other words, the frame pieces 7 and 8 are not interchangeable and will not engage properly with the cores if two of either type of frame piece should be used in one assembly, since the threads on the frame pieces would not be correctly positioned to engage properly with the threads on the cores; accordingly it is preferred to construct the interlocking parts of the opposite frame pieces differently to avoid improper assembly.

In an assembly of the above character it is important that proper frictional engagement and evenly distributed pressure be maintained between the frame pieces and the cores which are held in place between them, otherwise one of the cores if subjected to jars or vibrations may shift out of the adjusted position to which it has been set. For the above purpose one or both of the frame pieces 7 and 8 are provided with parts which interengage with the coil and coil form structure to prevent longitudinal, i. e. axial shifting of the coils, but which exert no clamping pressure on the coil form and coil structure, the block 11 being likewise relieved of the clamping pressure exerted by clip 9. In other words, the clip 9 applies its pressure at points between the cores 4 and 5, and this pressure is equally divided between and distributed to the cores so as to insure that each core will be frictionally held in proper position, the coil and coil form structure being held in proper axial position by the cores, and the frame pieces 7 and 8 having no direct supporting engagement with the coils and coil form except to hold the latter against longitudinal movement.

In the illustrated form of the invention, the frame pieces 7 and 8 are provided with inwardly extending flanges 19 which loosely surround the coil form 3 intermediate the coils 1 and 2 and are provided with pins 20 which engage in holes 21 in coil form 3, to hold the coil form and coil structure against longitudinal movement. As indicated in the lower left hand portion of Fig. 5 the tongues 7*a* of frame piece 7 are slightly spaced from the adjacent wall of block 11 when the clamping pressure is applied by spring clip 9, the frame piece 7 being free to move toward and from the block 11, whereby the clamping pressure of the clip 9 is applied only to the surfaces of the cores 4 and 5 and equally distributed between the latter.

The invention also includes special features of construction to accommodate conductor leads running from the coils 1 and 2 to the intermediate terminals 17 above described. For example, Fig. 7 shows an F. M. discriminator hook-up wherein the terminal strips A, B, C and D may be understood as corresponding to the terminals 15 above described, and a terminal strip F corresponding to one of the terminals 17 above described is connected to a point between two coil sections as shown in the figure, the remaining intermediate terminal strip previously described being idle in this instance. Fig. 8 shows another hook-up which also involves the use of five terminal strips as above described, and is appropriate for use as a ratio detector. The above diagrams are illustrative of various coil and condenser combinations and connections which may be readily obtained by assemblies having intermediate terminal strips as above described, and wherein the coils 1 or 2 may be sub-divided into sections involving additional leads extending to the terminals. Fig. 1, for example, shows three terminal leads 22, 23 and 24 extending from coil 1, the conductor lead 24 extending along lacing lugs 25 at one side of the frame piece 7 through one of the grooves 16 to a terminal strip 15. On the other side of the terminal strip 7 is provided a series of lacing lugs 26 having therein spaced sets 27 (Fig. 4) of conductor lead receiving notches therein. As shown in Fig. 1 the conductor lead 23 is laced along the inner set of these notches and led through one of the grooves 16 to a terminal strip 15. The frame piece 7 is provided with a passageway 28 (Fig. 1) running from the side edge of the frame piece 7 adjacent the notches 27 and between the tongues 7*a* to a point adjacent the corresponding terminal strip 17, the conductor lead 22 being received in this passageway and connected to terminal strip 17 as shown in Fig. 1. The frame piece 8 may be likewise provided with lacing lugs 29 (Fig. 4) similar to the lugs 25 above described but located on the opposite side of the assembly, and further lacing lugs 30 (Fig. 4) similar to the lugs 26 above described, and also a passageway 31 similar to passageway 28 but located on the opposite side of the assembly, to accommodate similar conducting leads extending from the coil 2. Thus the conductor leads extending from the coils 1 and 2 to the terminal strips 15 and 17 enable various circuit hook-ups of the character shown in Figs. 7 and 8 to be readily made.

While the invention has been disclosed as carried out by a coil and condenser assembly of the above described specific construction, it should be understood that changes may be made therein without departing from the invention in its broader aspects, within the scope of the appended claims.

I claim:

1. An assembly of the character described including a coil form, coils located in spaced relation therealong, and core members respectively serving said spaced coils, said core members having central portions extending within said coil form to hold the latter and said coils against transverse movements but said core portions being adjustable longitudinally of the coil form and coils, frame pieces extending longitudinally of said coil and coil form structure on opposite sides thereof, said core members including shell portions interposed between the coils and frame pieces, means clamping said frame pieces into frictional engagement with the shell portions of said core members to hold the latter adjustably in position, said frame pieces being mounted to afford relative movement of one toward the other except at their respective points of engagement with said shell portions of the core, thereby to distribute the clamping pressure substantially equally between said shell portions of the cores.

2. A coil and condenser assembly of the character described including a coil form, coils located in spaced relation therealong, and core members respectively serving said spaced coils, said core members having central portions extending within said coil form to hold the latter and said coils against transverse movements but said core portions being adjustable longitudinally of the coil form and coils, frame pieces extending longitudinally of said coil and coil form structure on opposite sides thereof, said core members including shell portions interposed between the coils and frame pieces, means clamping said frame pieces into frictional engagement with the shell portions of said core members to hold the latter adjustably in position, a condenser supporting block interposed between adjacent end portions of said frame pieces, said frame pieces and block having parts detachably interlocking to prevent relative movement between the frame pieces and block longitudinally of the coil structure, but at least one of said frame pieces being mounted to afford movement toward the other frame piece when clamping pressure is applied as aforesaid, except at their respective points of engagement with said shell portions of the core, thereby to distribute the clamping pressure substantially equally between said shell portions of the cores.

3. An assembly of the character described including a coil form, coils located in spaced relation therealong, and core members respectively serving said spaced coils, said core members having central portions extending within said coil form to hold the latter and said coils against transverse movements but said core portions being adjustable longitudinally of the coil form and coils, frame pieces extending longitudinally of said coil and coil form structure on opposite sides thereof, said core members including shell portions interposed between the coils and frame pieces, means clamping said frame pieces into frictional engagement with the shell portions of said core members to hold the latter adjustably in position, said frame pieces being mounted to afford relative movement of one toward the other except at their respective points of engagement with said shell portions of the core, thereby to distribute the clamping pressure substantially equally between said shell portions of the cores, at least one of said frame pieces having a part extending inwardly therefrom and detachably interengaging with the coil form and coil structure to hold said structure against movement longitudinally relative to the frame pieces while affording relative movement of one frame piece toward the other in response to the clamping pressure.

4. An assembly of the character described including a coil form, coils located in spaced relation therealong, and core members respectively serving said spaced coils, said core members having central portions extending within said coil form to hold the latter and said coils against transverse movements but said core portions being adjustable longitudinally of the coil form and coils, frame pieces extending longitudinally of said coil and coil form structure on opposite sides thereof, said core members including shell portions interposed between the coils and frame pieces, means for clamping said frame pieces into frictional engagement with the shell portions of said core members, at least one of said frame pieces carrying a part having plug and socket engagement with the portion of the coil form between the spaced coils to prevent longitudinal movement of the coil form and coil structure relative to the frame pieces, but said frame pieces being mounted to afford relative movement one toward the other in response to the clamping pressure except at their respective points of engagement with said shell portions of the core, thereby to distribute the clamping pressure substantially equally between said shell portions of the cores.

5. A coil and condenser assembly of the character described, including coils and cores which are substantially axially alined, frame pieces extending longitudinally of said coil and core structure on opposite sides thereof, a condenser supporting block interposed between adjacent end portions of said frame pieces, the end portions of the frame pieces having tongues overlapping opposite sides of said block and being detachably interengageable therewith by movement of the frame pieces toward the block, the tongue portions of said frame pieces each having opposed shoulders fitting between respectively opposed complementary shoulders on the respectively adjacent sides of the block to hold the frame pieces and block against relative movements longitudinally of the coil and core structure.

6. A coil and condenser assembly of the character described including a coil form, coils located in spaced relation therealong, and core members respectively serving said coils, frame pieces extending longitudinally of said coil and coil form structure on opposite sides thereof, a condenser supporting block interposed between adjacent end portions of said frame pieces, the opposite sides of said block which are respectively adjacent said frame pieces having terminal strips projecting therefrom and at least one of said sides having such a terminal strip projecting from the intermediate portion thereof substantially in line with the corresponding frame piece, said last mentioned frame piece having lacing lugs extending along at least one side edge thereof, said last mentioned frame piece and block structure having therein a conductor lead receiving passageway extending from said last mentioned side of the frame piece to a point adjacent said intermediate terminal strip, and a conductor lead extending from at least one of said coils along said lacing lugs and passageway to said intermediate terminal strip.

7. A coil and condenser assembly of the character described including a coil form, coils lo-

cated in spaced relation therealong and core members respectively serving said coils, frame pieces extending longitudinally of said coil and coil form structure on opposite sides thereof, a condenser supporting block interposed between adjacent end portions of said frame pieces, the opposite sides of said block which are respectively adjacent said frame pieces having terminal strips projecting therefrom and at least one of said sides having a row of such terminal strips projecting therefrom, one of which is located substantially in line with the corresponding frame piece, said last mentioned frame piece having lacing lugs extending along at least one side edge thereof, which are provided with a plurality of sets of conductor receiving notches, said last mentioned frame piece and block structure having therein a conductor lead receiving passage-

way extending from said last mentioned side of the frame piece to a point adjacent said intermediate terminal strip, and conductor leads extending from said coils, one of which extends along one of the aforesaid sets of notches of the lacing lugs and passageways to said intermediate terminal strip, and another of which extends along another of said sets of notches to another of said terminal strips.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
2,435,630	Ketcham	Feb. 10, 1948