Aug. 16, 1932. S. CHRISTY 1,872,407

HEATING ELEMENT AND SUPPORT THEREFOR

Filed Oct. 22, 1928 2 Sheets-Sheet 1

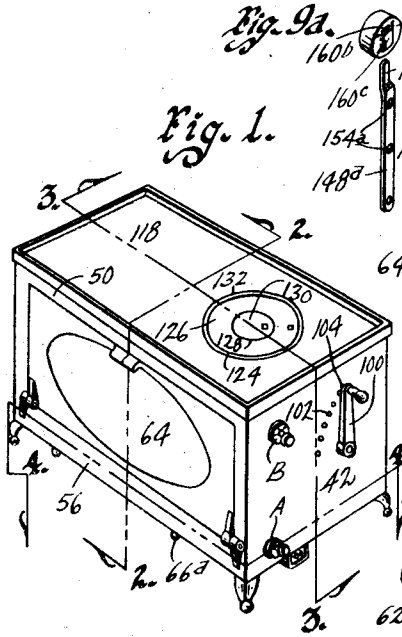


Fig. 1.

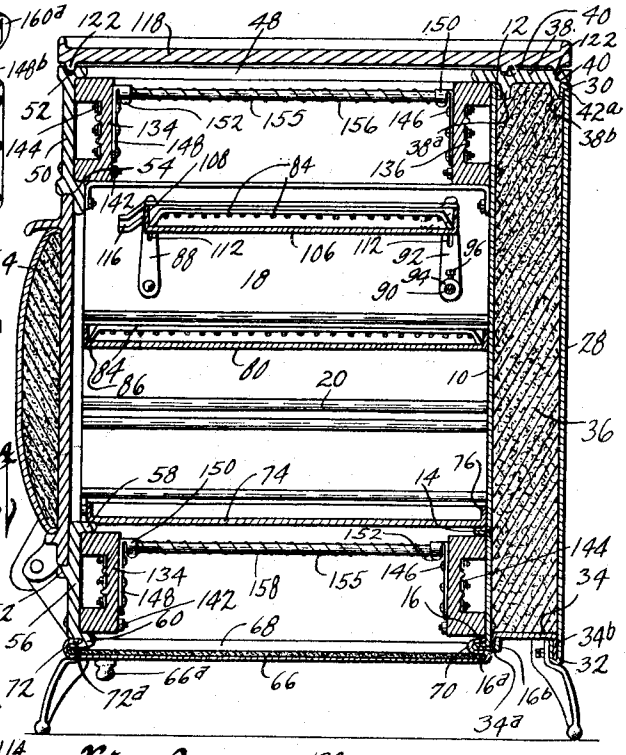


Fig. 2.

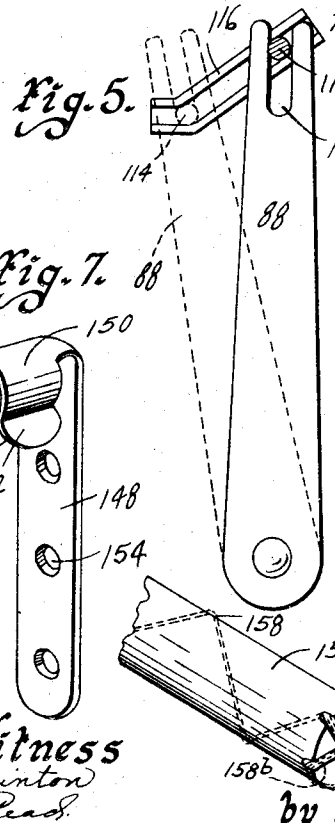


Fig. 5.

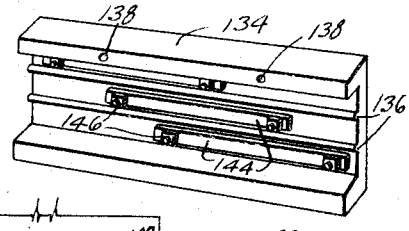


Fig. 6.

Fig. 7.

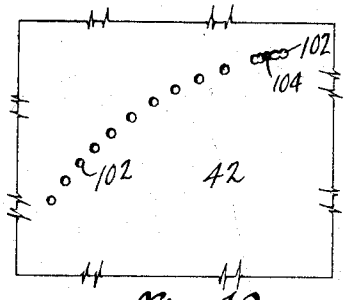


Fig. 10

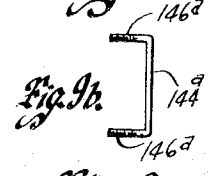


Fig. 9b.

Fig. 8.

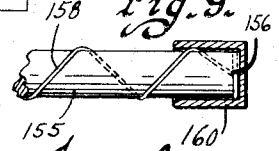


Fig. 9.

Witness
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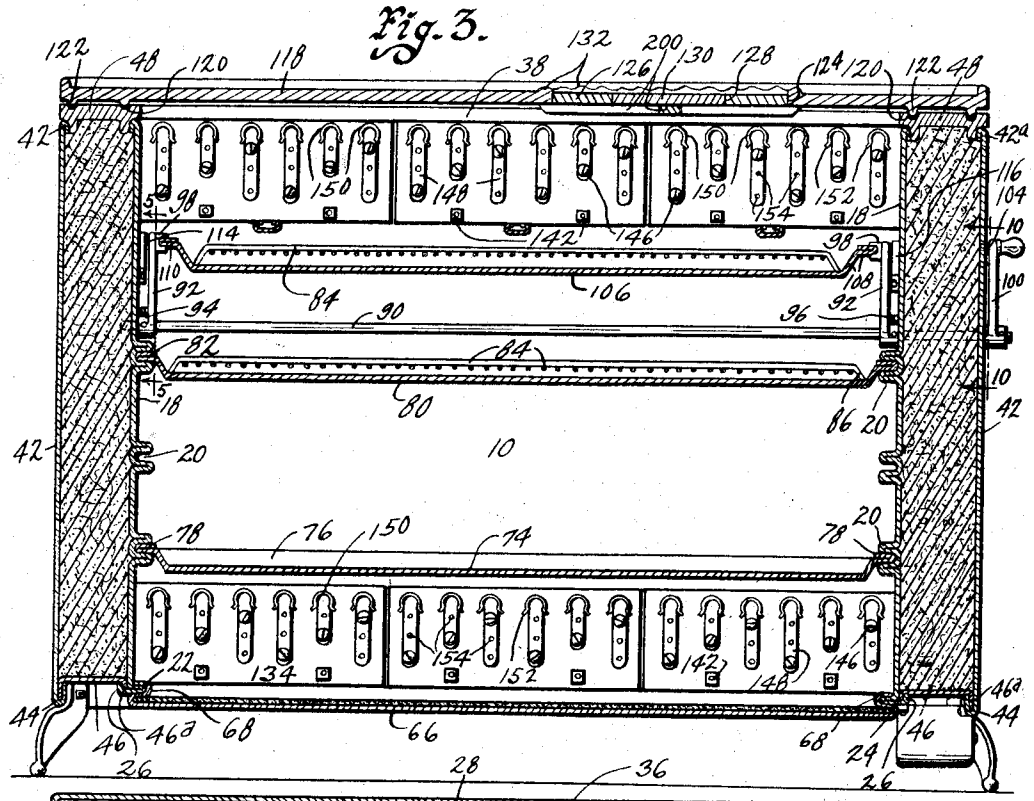
Inventor
Sam Christy
by Baur & Freeman Attorneys

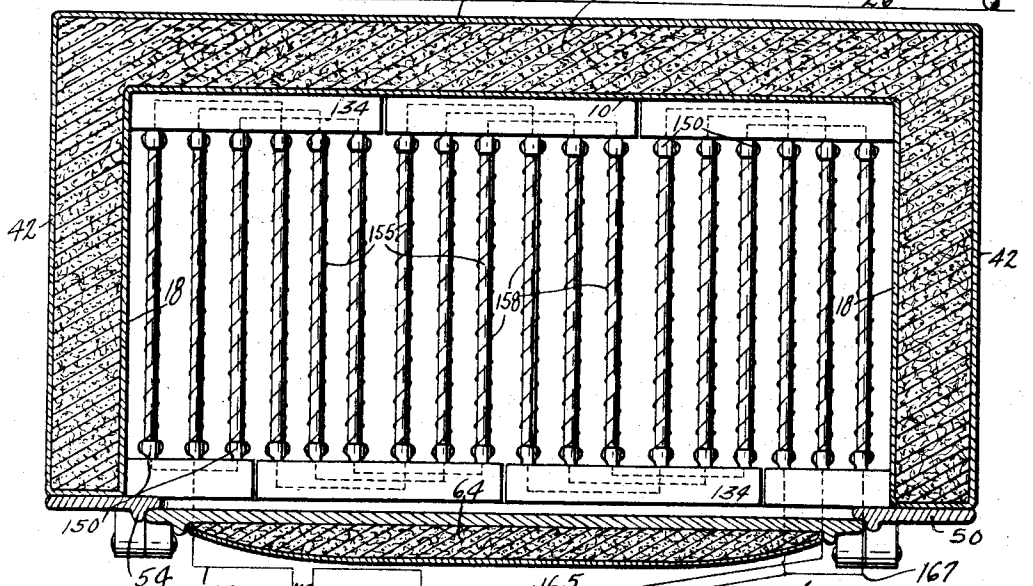
Aug. 16, 1932. S. CHRISTY 1,872,407

HEATING ELEMENT AND SUPPORT THEREFOR

Filed Oct. 22, 1928 2 Sheets-Sheet- 2

Fig. 3.





Witness
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Fig. 4.

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UNITED STATES PATENT OFFICE

SAM CHRISTY, OF DES MOINES, IOWA

HEATING ELEMENT AND SUPPORT THEREFOR

Application filed October 22, 1928. Serial No. 314,083.

The object of my invention is to provide a combination stove, oven and broiler of simple, durable and inexpensive construction.

More particularly, it is my object to provide such a combination stove, oven and broiler of the type heated by electricity and to provide therein novel means for mounting the resistance units in a manner convenient for installation, removal or replacement.

Another purpose is to provide in such a device various novel features of construction of the case and parts supported thereon.

Still another feature is to provide in such a device a novel mounting for a broiler pan.

With these and other objects in view, my invention consists in the construction, arrangement and combination of the various parts of my combination stove, oven and broiler, whereby the objects contemplated are attained, as hereinafter more fully set forth, pointed out in my claims, and illustrated in the accompanying drawings, in which:

Figure 1 shows a perspective view of a combination stove, oven and broiler embodying my invention.

Figure 2 shows a detail, sectional view taken on the line 2—2 of Figure 1.

Figure 3 is a longitudinal, detail, sectional view taken on the line 3—3 of Figure 1.

Figure 4 is a horizontal, sectional view taken on the line 4—4 of Figure 1.

Figure 5 is a detail, sectional view taken on the line 5—5 of Figure 3.

Figure 6 is a perspective view of one of the insulator blocks.

Figure 7 is a perspective view of one of the resistance unit hangers.

Figure 8 is a perspective view of a portion of one of the resistance units.

Figure 9 is an elevation of one of the resistance units, the metal cap therefore being shown in section.

Figure 9A is a perspective view of another form of cap and hanger.

Figure 9B is a perspective view of a modified form of a connector; and

Figure 10 is a detail, sectional view taken on the line 10—10 of Figure 3.

My improved combination cooking device comprises a casing having double back and end walls, a top and a bottom and a front.

In the accompanying drawings, I have shown in Figure 2, an inner rear wall indicated by the reference character 10, comprising a vertical sheet, preferably of metal, having at its upper edge the over and downturned member 12, so formed for reinforcing purposes.

Near its lower portion, the inner lower wall member 10 has above its lower edge an inwardly projecting flange 14. At its lower edge, the wall member 10 is turned inwardly or forwardly to form the flange 16. The material at the forward end of the flange 16 is bent and extended rearwardly to form a lower parallel flange 16*a*, having at its rear edge the upwardly projecting flange 16*b* spaced from the wall 10.

Formed preferably integrally with the ends of the walls 10 are the inner end walls 18. The inner end walls 18 are provided with pairs of flanges 20. These flanges 20 are for the purpose of receiving and supporting shelves, pans or the like.

At the bottom edge of each end member 18 is an in-turned horizontal flange 22. From the inner edge of each flange 22, the material is turned outwardly to form a second lower, parallel flange 24 terminating in an upwardly inclined flange 26 spaced from the end wall 18, as shown in Figure 3.

Spaced rearwardly from the rear wall 10 is an outer rear wall 28, having its upper end beaded or folded over as at 30, and its lower end bent upwardly to form a channel 32.

A downwardly opening channel 34 is arranged at the bottom of and between the walls 10 and 28 with its flanges 34*a* and 34*b* received between the flange 16*b* and the wall 10 and in the channel 32 respectively, as shown in Figure 2.

The space between the walls 10 and 28 may be filled with any suitable insulating material 36. This space is covered by a cover plate 38 having downwardly projecting flanges 38*a* fitting adjacent to the upper edges of the walls 10 and 28.

The upper surface of the plate 38 is pro-

vided with spaced parallel longitudinal grooves 40. Spaced laterally from each inner end member 18 is an outer end member in the form of a plate or wall 42, having its upper end beaded as at 42*a*, and its lower edge bent to form an upwardly opening channel 44.

At the lower parts of the end members 42 and 18 at each end of the casing, a downwardly opening channel 46 has its flanges 46*a* received in the channel 44 and between the flange 26 and wall 18 respectively.

The space between the walls 42 and 18 at each end of the device is filled with heat insulating material 36, such as has already been mentioned. This space is covered at the top by means of a cover plate 48, similar to the cover plate 38 already described. The cover plates 38 and 48 may be integrally connected if desired.

The end members 42 are connected at their upper parts by a longitudinal frame member 50 having at its upper edge the groove 52 and in its lower edge the rabbet 54.

At their lower parts, the end members 42 are connected by a front frame or wall member 56, having at its upper edge the rearwardly projecting flange 58 and at its lower edge the forwardly opening channel 60 and between its upper and lower edges the forwardly projecting flange 62. The channel 60 is so shaped as to form a shelf or shoulder projecting slightly rearwardly from the frame member 56.

Hinged to the frame member 56 is a door 64 for closing the front of the casing. The bottom of the casing is formed by means of a removable member, comprising a plate 66, having at its ends the outwardly opening channels 68, which may slidably receive the members 22 and 24 formed on the end members 18. At its rear edge the plate 66 has a rearwardly opening channel 70 to receive the members 16 and 16*a* (see Figure 2). At its front edge, the plate 66 has a wider rearwardly opening channel 72, the upper flange 72*a* of which slips into the channel 60 for thus making a tight joint.

I provide a catch pan 74 for the bottom of the casing having the upwardly inclined peripheral flange 76, which is provided at its side edges with the laterally projecting flanges 78 adapted to slide between the lowermost pair of flanges 20, as shown in Figure 3.

I provide a similar pan 80, which may have its flanges 82, corresponding to the flanges 78 slid between the members of upper pairs of flanges 20.

A perforated plate 84 with a down-turned peripheral flange 86 may be placed in the pan 80.

At the upper part of the casing, I provide a pan holding frame for receiving a similar pan.

To each side wall near the front thereof an arm 88 is pivoted at its lower end and is inclined upwardly. A shaft 90 is mounted in the end walls near the rear of the casing about the same height as the pivots of the arms 88.

Arms 92 have hubs 94 fixed on the shafts 90 by means of set screws 96.

The front and rear arms 88 and 92 are arranged parallel as shown in Figure 2.

At each end of the casing an inwardly opening channel 98 shown in Figure 3 is pivoted to the upper ends of the respective arms 88 and 92.

On one end of the shaft 90 outside the casing is a crank 100. By manipulating the crank 100, the shaft 90 may be rotated for rocking the arms 92 and 88 and swinging the channels 98 forwardly or rearwardly.

For holding the frame thus provided in different positions of its adjustment, I provide a series of holes 102 in one of the end walls 42. The crank arm 100 is resilient and is provided with a pin 104 (see Figure 3) to coact with the respective holes 102.

I provide a pan 106 having the peripheral flange 108 (see Figure 3). At the ends of the pan 106 laterally projecting flanges 110 are formed. The flanges 110 are adapted to slide into the channels 98, (see Figure 3).

A plate 84 similar to that already described may be placed in the pan 106. The pan 106 may be used for broiling, and insomuch as the upper heating units are immediately above it, it is sometimes desirable that it should be raised higher than it normally stands, when the arms 88 and 92 are in their upright positions.

For raising it upwardly after it has cleared the wall member 50, I provide the following means:

In the upper ends of the arms 88 and 92 are elongated slots 112. The channels 98 are mounted on the arms 88 and 92 by means of pins 114 extending from the channels 98 through the slots 112 and into guide channels 116 mounted on the inner faces of the walls 18.

These guide channels open inwardly and are curved as shown in Figures 2 and 5, so that when the arms 88 and 92 are in their lowered positions, illustrated in Figure 5 in dotted lines, for holding the pan 106 in its position projecting out of the casing, and are then swung upwardly toward their vertical positions, the pins 114 will enter the lower forward parts of the channels 116. The dotted line position of the arm 88 and pin 114 illustrates those parts in their positions then assumed.

As the arms 88 and 92 finish their rearward, inward stroke, the pins 114 are guided upwardly in the channels 116, thus raising the channels 98 and the pin 106, until the pins 114 stand substantially above the lower

ends of the slots 112, as illustrated in Figures 2 and 5.

A cover plate 118 forms the top of the casing.

Asbestos wicking or the like 120 may be placed in the grooves 40 and 52, and the plate 118 is provided with ribs 122 to fit into said grooves for forming tight joints.

The plate 118 is formed with a hole 124. The material around the hole is beveled, and the hole is normally closed by a beveled lid or closure member 126. The lid 126 has a smaller similar hole 128 into which fits a smaller similar lid 130. Around the hole 128 is a raised, annular corrugated rib 132, upon which an upright pan or the like may be seated, if desired.

It will be seen that if one of the lids 130 or 126 is removed, and a pan is placed in position above the hole thus left, heat may escape upwardly around such pan or the like.

I will now describe the mounting and arrangement of the heating units in my improved combination stove, oven and broiler.

I provide a plurality of insulating blocks 134, which serve to support the resistance units. Each of these insulator blocks is made in the general form of a channel, as shown in Figure 6, preferably with shallow ribs 136, extending lengthwise in spaced relation from each other and from the flanges of the channel.

Holes are provided at 138 for supporting bolts, and are provided for current conducting wires or posts 146.

A series of these blocks 134 is arranged end to end, opening rearwardly in alignment against the upper part of the inner face of the rear wall 10. They are secured to the wall 10 by means of bolts 142 (Figure 3) extended through the holes 138 (Figure 6) and through the wall 10.

A similar row of blocks 134 is secured to the inner face of the wall member 50 with the channels opening outwardly.

Before the blocks 134 are installed as above mentioned, they have assembled on them resistance unit hangers suitably connected in the following manner:

The holes 140 for the wires or posts 146 are arranged in pairs, which are respectively horizontally aligned.

The pairs are arranged at different heights and are staggered as shown in Figure 6.

Metal conducting strips 144 are arranged on the inner face of the channel between each pair of holes, as shown in Figure 6.

The posts or wires 146 are extended through the ends of each strap 144 and through the holes 140.

On what may be called the back side or outer side of each channel-shaped block 134, there is mounted on each post 146 a resistance unit hanger or support 148, comprising a flat strip, having at its upper end a projecting U-shaped yoke 150, the arms of which form a contracted neck 152. The yokes 150 may be arranged opening downwardly as shown in Figure 7. The hangers 148 are provided with a series of holes 154. The posts 146 are extended through one of the holes 154 in each resistance unit hanger and the hangers are thus adjusted to the same heights in horizontally spaced pairs on each block 134.

At the back of the casing, each hanger 148 is aligned with a similar hanger at the front of the casing.

The two upper hangers are connected by one of the strips 144, the next two lower hangers by a similar strip, and the two lower hangers by a similar strip.

Thus the first and fourth, second and fifth, and third and sixth hangers of each block are connected together.

As many blocks may be used as may be desired.

In the illustration here shown, I have shown three of them aligned at the front and three at the back of the casing.

The resistance units extending fore-and-aft in the casing are of the kind illustrated in Figure 8, comprising a pencil 155 of porcelain or the like having crossed slots 156 in its ends. A nichrome wire or other resistance wire 158 is wound on each pencil and has its end extended through one of the slots 156 as at 158*a*, and then wound a quarter way around the pencil and extended through the other of the slots as at 158*b*.

The wire is snugly held in place by means of a metal cap 160 mounted on each end of the pencil 155. The caps 160 are snapped into the yokes 150 and on account of the peculiar structure herein explained are easily installed and are very easily removed for the purpose of replacing any resistance unit which may have burned out.

In Figure 9B, I have shown a connector which may be used instead of the strips 144 and post 146. This connector comprises a strip member 144*a* having at its ends the threaded posts 146*a*, properly spaced to enter a pair of the aligned holes 140. These connectors may be used with the hangers 148 or with hanger elements 148*a* having the spaced holes 154*a* similar to the holes 154. At the upper end of each hanger element 148*a* is an offset upwardly projecting tapered end 148*b*.

When the hanger elements 148*a* are employed, I use a cap 160*a* shown in Figure 9A for the ends of the resistance units. The cap 160*a* has two spaced parallel slots 160*b* in its ends. The metal between the slots is pressed out to form a guide 160*c* to receive the tapered end 148*b*.

A similar arrangement of resistance units is provided in the bottom of the case.

The wiring arrangement for both the top

and bottom sets of resistance units is illustrated in Figure 4. In that figure, I have shown the conducting wires 162 and 163. The wire 162 is connected for instance with the three left-hand posts 146 at the front of the casing. The three-left-hand posts at the back of the casing are connected by the appropriate strips 144 with the fourth, fifth and sixth posts from the left.

The fourth, fifth and sixth posts from the left at the front of the casing are then connected by the appropriate strips 144 with the fourth, fifth and sixth posts from the left.

The fourth, fifth and sixth posts from the left at the front of the casing are then connected with the seventh, eighth and ninth posts and so on for connecting all of the resistance units.

Coming now to the three right-hand posts 146 at the front of the casing, it will be noted that I have provided a switch A having the movable member 164 connected with the lead wire 163, and having the three contact points marked—1, 2 and 3.

Contact point 1 is connected by a wire 165 with the second post from the right hand end of the casing at the front thereof. A branch wire 166 connects the wire 165 also with contact point 3.

Contact point 2 is connected by a wire 167 with the right-hand post 146 at the front of the casing. A branch wire 168 connects the wire 167 with the third contact post 146 from the right.

Thus it will be seen that the movable switch member 164 may be moved to neutral or circuit breaking position or may be moved to contact with post No. 1.

In that case, a circuit will be closed through the movable switch member 164, the wire 163, the wire 162, the second resistance unit from the left, and then to the right through each third resistance unit to the second resistance unit from the right, the wire 165, and the contact 1.

By swinging the switch member 164 until it clears contact point 1, it can be made to engage contact point 2, and thus close a circuit through two-thirds of the resistance units.

By moving the switch member 164 until it engages both contacts 2 and 3, a circuit will be closed through all of the resistance units.

The switch A is for the control of the units at the bottom of the casing, and a similar switch B (Figure 1) is provided for controlling circuits through the units at the top of the casing.

From the foregoing, it will be seen that I have provided a combination cooking stove, oven and broiler, which can be used for a great variety of purposes.

My device is of very simple construction and can be made largely of stampings, so that it is economical.

The resistance units are cheap to make and they can be easily replaced when they burn out. The lower ones are replaced by opening the door and taking out the catch pan, whereupon the lower units can be taken out and others put in their places. The upper units can be replaced by lifting off the top unit 118 for giving access to them.

By removing the pan 80 or putting it in a little lower position than that shown in Figure 3, my device may be used as an oven for baking pies, cakes or bread. Steaks may be broiled or fried, and cooking of any kind may be done.

The small lid 130 may be removed and dishes or pans placed over the hole 128 for keeping them warm.

Similarly the lid 126 may be removed for the same purpose.

The upper pan 106 is used primarily for broiling and can be held quite close to the upper resistance units on account of the peculiar mechanism for controlling it.

I preferably arrange below the hole 124 a grid or the like 200 to keep small pans or other containers from dropping through the hole 124.

It will be obvious, of course, that changes may be made in the details of the structure of my device without departing from the real spirit and purpose of my invention, and it is my intention to cover by my claims, any modified forms of structure or use of mechanical equivalents, which may be reasonably included within their scope.

I claim as my invention:

1. In a device of the class described, a resistance unit comprising an insulator core having a resistance wire wound thereon, metal caps for the ends of said core and means of connection between said resistance wires and said caps comprising crossed slots in the ends of said cores for receiving the ends of the resistance wire, first in one slot, then around the periphery of the core, then through the other slot and contacting with the wire therein after which the caps are forced onto the ends of the core and over the ends of the resistance wire.

2. Means for supporting the ends of resistance units comprising clips, channel shaped insulator blocks, said clips being mounted on the faces of said blocks with members which extend through the blocks and into the recesses thereof and electrical connecting means between the members extending through the blocks comprising members extending longitudinally in said recesses.

3. Means to support a resistance unit comprising an end cap on each end of the unit and having a pair of slits therein, the portion of the cap between said slits being bent outwardly from the cap and a clip for each cap having a prong to extend through such outwardly bent portion and frictionally engage therein.

4. A resistance unit comprising a core having crossed slots in each end thereof, a resistance wire wound on said core and having ends extending through one slot on each end of said core, then around said core to and through the other slot and caps of conducting material fitted snugly over said ends of said cores and contacting with said ends of said resistance wire wound thereon.

5. Means to support a resistance unit comprising an end cap on each end of said unit and connected with the resistance wire thereof, each end cap having a slit therein, a portion of the cap adjacent said slit being bent outwardly from said cap and a clip for each cap having a portion extending through said slit and into said outwardly bent portion.

Des Moines, Iowa, December 16, 1927.

SAM CHRISTY.