The object of this invention is the provision of an improved plate for vacuum tubes and aims particularly to improve the method of attaching the “getter” to the plate. It is important that manual operations be eliminated as far as possible in the manufacture of such plates, since grease and other contaminating matter is readily transferred from the hand to the plate during handling, such contaminations having a harmful effect on the operation of the tube. In the usual practice a small patch of the “getter” is spot-welded to the plate after it has been stamped and before it is assembled with the other parts forming the tube. Since this welding is done manually the plate is exposed to contaminations from the hand and is also liable to be distorted during the operation.

In one form of the present invention the “getter” is supplied in the form of wire and is rolled into depressions formed in the plate material before the plates are punched. This is a continuous process carried out by automatic machinery and eliminates the disadvantages of manual handling.

In the drawings:

Fig. 1 is a diagrammatic view showing the steps in manufacturing the plate;

Fig. 2 is a plan view illustrating the condition of the metal strip after passing through the perforating rollers;

Fig. 3 is a plan view illustrating the condition of the metal strip after passing through the pressing rolls;

Fig. 4 is a perspective of a finished plate;

Fig. 5 is a longitudinal section through Fig. 2;

Fig. 6 is a longitudinal section through Fig. 3;

Fig. 7 is a diagrammatic view of an alternate method of manufacture;

Fig. 8 is a section through the groove-forming rolls;

Fig. 9 is a perspective of the strip after passing through the groove-forming rolls;

Fig. 10 is a section through the pressing rolls of Fig. 7;

Fig. 11 is a perspective of a plate resulting from the process of Fig. 7;

Fig. 12 is an enlarged fragmentary section through the wire as attached by the rolls of Fig. 10;

Fig. 13 is a fragmentary plan of a further modification;

Fig. 14 is a section on line 14—14 of Fig. 13.

Referring to the drawings more specifically, the perforating rollers comprise the male roller 10 carrying the studs 11 and the female roller 12 provided with holes 13 registering with the studs. The blank strip of metal 14 from which the plates are to be formed is first passed through these perforating rollers and is thereby formed with a series of holes 15 running along its center.

The strip 14 after leaving the perforating rollers is directed by guides 16 toward the pressing rolls 17. A wire 18 of magnesium or other suitable “getter” material is simultaneously directed between the pressing rolls at the same rate of movement as that of strip 14 and in such a position that it will overlie the series of holes 15. The pressing rolls act to press the wire into the holes 15, filling them with discs 19 of “getter” material as shown in Figs. 3 and 4. The part of the wire not pressed into the holes falls aside as waste.

The strip now passes between the guides 20 which direct it toward the punch press 21 which stamps out the finished plates as shown in Fig. 4.

In the alternate process of Fig. 7 the strip 14 is first passed through the groove-forming rolls 22 and 23, which are shaped to press a groove 24 into the strip as clearly shown in Figs. 8 and 9. The strip is then guided to the pressing rolls 25 and 26 which press the wire 18 into the groove and Gwen the edge of the groove about the wire to hold it in place as clearly shown in Fig. 12. The strip now moves to the punch press 21 which forms the finished plate of Fig. 11.

In the modification of Fig. 13 the perforating rollers punch a series of triangular gripping fingers 27 upwardly from the strip. A flat ribbon 28 of “getter” material is laid between the fingers 27 which are pressed over the ribbon to the gripping position of Figs. 13 and 14 by the pressing rolls.

It will be clear that this process is one in which all the operations are carried out by machines upon a strip which is moved and directed by the mechanism. As a result the “getter” material is secured to the plate without manual handling, and is distributed along the entire length of the plate for efficient action. I also contemplate distributing the “getter” material over the entire length of the plate by applying to the plate a liquid containing the “getter” material; or the plate may be covered with a film of “getter” metal by feeding it through or submerging it in a
molten bath of the latter; or by electro-deposition of “getter” metal on the plate.

I claim:—

1. A plate for vacuum tubes, a depression in said plate, and getter material pressed into said depression.

2. A plate for vacuum tubes, a groove in said plate, and getter material pressed into said groove.

3. In the process of forming plates for vacuum tubes, forming a depression in a strip of material, pressing getter material into the depression, and punching a plate from the strip.

4. In the process of forming plates for vacuum tubes, the steps of forming a groove in the plate material and pressing getter material into the groove.

5. In the process of forming plates for vacuum tubes, the steps of forming a groove in the plate material, pressing getter material into the groove, and peening the edges of the groove about the getter material.

6. The process of forming plates for vacuum tubes comprising passing a strip of material through groove-forming rolls to press a groove into the strip, then passing the strip together with a wire of getter material through pressing rolls to press the getter material into the groove, and running the strip through a punch press for forming plates from the strip.

7. A plate for vacuum tubes comprising a relatively thin sheet, getter material secured to the sheet along a vertical axis of the plate, the getter material being in the form of a continuous solid, and being a different substance from the material of the sheet.

In testimony whereof I affix my signature.

ALBERT LOPPacker.