To all whom it may concern:

Be it known that I, WILLIAM L. CALDWELL, a citizen of the United States, residing at Canton, in the county of Stark and State of Ohio, have invented a new and useful Metallic Furring-Plate, of which the following is a specification.

My invention relates to improvements in furring plates made from sheet metal; and the objects of the invention are to generally improve plates of the character mentioned, to provide a furring plate adapted to support and hold the plaster, concrete or other material applied in plastic condition, permitting sufficient of said material to pass through the openings in said plate to form clutches without the undesirable waste caused by too much of the material passing through the openings, as commonly occurs with furring plates heretofore employed, to so form the plate as to make it strong and capable of thoroughly reinforcing the plaster or concrete applied thereto, the tensile strength of the plate being retained as far as possible by reason of the peculiar formation and arrangement of its parts, which peculiar formation and arrangement at the same time serve to firmly unite the plate and plaster or concrete when applied. These objects, together with other objects readily apparent to those skilled in the art, I attain by the construction illustrated in the accompanying drawing, although my invention may be embodied in other forms, the construction illustrated being chosen by way of example.

In the drawings Figure 1 is a perspective view of a fragmentary portion of a furring plate embodying my invention, illustrating one of the sections thereof. Fig. 2 is a plan view of a furring plate made up of sections such as shown in Fig. 1, portions of said plate being broken away. Fig. 3 is a sectional view illustrating a desirable method of attaching the plate to a metallic purlin in roof construction. Fig. 4 is a sectional view taken on the line 4−4 of Fig. 1 but also showing a quantity of concrete properly applied. Fig. 5 is a sectional view on the line 5−5 of Fig. 1. Fig. 6 is a sectional view of a joint between two plates showing how adjacent plates inter-lock at their lateral edges.

Throughout the several views similar reference numerals indicate similar parts. While furring plates of the character herein described may be used for a large number of purposes where expanded metal lath and other furring means are now commonly employed, one of the most important uses of such a plate as herein disclosed is in the construction of concrete roofs in fireproof buildings. In such roofs metallic purlins, usually of channel iron, are arranged horizontally from truss to truss of the roof parallel to each other and at a distance between purlins of say four feet more or less. The metallic furring plates are then connected to the purlins and concrete in plastic condition spread over said plates to a thickness of say two inches, the furring plates acting not only as means for holding the concrete in position, but also supporting and reinforcing the same.

In Fig. 3 is illustrated a channel iron purlin 1, a furring plate 2 arranged thereon, and a lugged bolt 3 provided with a nut 4, said bolt passing through the plate 2 and having its lug engaging one of the sides of the channel 1 for the purpose of attaching the plate thereto. The channel and plate 2 are shown in horizontal position in said figure, although as commonly in use the plate 2 as well as the channel 1 would be disposed at an angle to the horizontal conforming to the pitch of the roof.

My invention does not reside in the arrangement of purlins or the attachment of the furring plates to the same, the description above being given in order to more fully disclose the use and purpose of my invented plate.

A furring plate embodying my invention such as shown in Fig. 2 comprises a plurality of longitudinal series of formed sections, the various longitudinal series being arranged side by side and the whole being formed from a single sheet of metal. Each section is provided with a frame composed of the side frame pieces 5 and the transverse, headed frame pieces 6. The beads in the frame pieces 6 extend to the outer,
lateral limits of the frame pieces 5 as will be seen from an inspection of Fig. 1, thus being arranged intermediate longitudinally adjacent side pieces 5. Continuing laterally from the outer limits of the side pieces 5 the metal is formed into the longitudinally disposed, depressed, strengthening beads 7, the beads in the frame pieces 6 "dying out" in the said beads 7. Continuing from the beads 7 the metal extends upwardly for a considerable distance above the general plane of the plate to the point 8, where it is folded over and extends downwardly, the two folded portions thus producing the main rib 9 extending longitudinally from end to end of the plate and interposed between laterally adjacent series. As well illustrated in Figs. 4 and 5 at 10 the intermediate ribs 9 are symmetrical in cross-section. Each side of each rib arises at its base from a depressed bead 7. It will be understood that the beads 7 as well as the ribs 9 extend longitudinally from end to end of the plate.

Along one lateral edge of the plate an outer joint rib is formed such as illustrated at 11 in the figures. This rib on the side toward the body of the section is formed in the same manner as the intermediate ribs of the plate, but the outer side of the rib terminates in a straight, free edge narrower than the inner side of the rib and adapted to over-lie the inner side of the rib of a laterally adjacent plate, forming an interlocked joint such as shown in Fig. 6. The rib along the opposite lateral edge of the plate may be similarly formed, or the outer side of said rib may be extended into at least a portion of a bead 7 as shown at 12 in Fig. 6, the curl or curve of the extreme edge of the plate thus serving to engage the under side of the bead 7 of the interlocking plate.

The body of each section bounded by the frame pieces 5 and 6 is provided with a plurality of longitudinal, parallel slits, thus forming said body into a plurality of parallel, longitudinally disposed strips or strands 13 extending from one beaded frame piece 6 to the other. Said strands are formed with reversed curves extending beyond the general planes of both sides of the body of the section. While the strands may be provided with any number of curves it is preferable that each strand have two curved portions extending outwardly from one side of the body of the section and one curved portion extending beyond the other side of said body. This construction is well illustrated in Fig. 1. It should be further noted that the curvatures of adjacent strands are reversed so that laterally adjacent portions of laterally adjacent strands will be oppositely curved. Viewing the section on one side only, as in Fig. 1, a depressed or downwardly curved portion of an intermediate strand will have, on both sides of it, the upwardly curved or raised portions of adjacent strands. This construction will be further understood by an inspection of Figs. 4 and 5. In forming the strands with the curves as described it will be apparent that a longitudinal stretching or drawing of said strands will be necessitated, said strands being slightly longer than the straight frame pieces 5 at the sides of the section.

Each of the strands 13 is provided with a longitudinal, depressed bead 14 terminating at the frame pieces 6 coincidently with the termination of the strands. The said beads strengthen the strands and produce an uneven surface for the reception of the concrete. In addition to the longitudinal bead 14 it should be noted that the lateral edges of the curved portions of the strands are turned or bent toward the body of the plate, or in other words those portions of the strands curved downwardly beyond the general plane of the plate have their lateral edges bent upwardly, while those portions of the strands curved upwardly above the general plane of the plate have their lateral edges bent downwardly. In this way the different portions of any one lateral edge of a strand will be bent in opposite directions and the adjacent edges of adjacent strands will be bent toward each other, thus producing a structure especially well adapted for holding the concrete in place. In Figs. 4 and 5 the bent edges of the strands are readily apparent.

The beads in the transverse frame pieces 6 strengthen and stiffen said frame pieces as well as produce an uneven surface for the concrete. It will also be understood that the frame pieces 6 carry the strains of the intervening area from the strands into the ribs 9. Said ribs may be made of different heights depending upon the use to which the plate is to be put, the weight it is to bear, and other circumstances. In the sides of the ribs 9 are arranged spaced impressions 15, preferably elevated or raised outwardly as illustrated, although depressions rather than elevations may be employed if desired. Such impressions are adapted to engage the concrete adjacent the rib, giving the same a better hold upon the metal so as to utilize the full tensile value of the rib. The making of said impressions will also raise the elastic limit of the metal composing the rib. The beads 7 add to the vertical height of the sides of the ribs without bringing the point 8 so far above the general plane of the plate as would otherwise be necessary. In addition said beads 7 strengthen and stiffen the plate as will be well understood by those skilled in the art.
In Fig. 4 a quantity of concrete 16 is shown arranged upon the plate, the said concrete being of a thickness sufficient to bring its upper surface considerably above the tops of the main ribs 9. It will be noted that the concrete closely fits into the various beads in the plate and extends into the depressed or downwardly curved portions of the strands 18, small portions of the concrete being pressed out between the spaced, bent edges of the strands and forming the clenches 17.

One of the peculiarly advantageous features of my invented plate is the manner in which the clenches 17, in conjunction with the various strands, form a surface adapted for the reception of plaster on the opposite side of the plate from that on which the concrete 16 is applied. In Fig. 4 it will be noted that the concrete forming the clenches 17, as it is pressed out between the bent edges of laterally adjacent strands, extends inwardly and sinks downwardly under its own weight, forming the dove-tailed groove shown at 18, which is well adapted to receive and hold plaster applied to the under side of the plate after the clenches 17 have hardened. Dove-tailed grooves or depressions such as shown at 18 will occur wherever there is an upwardly curved portion of a strand intermediate downwardly curved portions of adjacent strands and such grooves will thus be thoroughly distributed over the body of each section.

The metal forming my invented plate being cut or slitted longitudinally only will retain practically all of its tensile strength longitudinally and the clenches 17, serving to brace and bind adjacent edges of the curved strands, will form, with such strands, a large number of miniature truss structures well adapted to brace, strengthen and stiffen the body of each section, the strains of the intervening area being carried, through the transverse beaded frame pieces 6, into the main ribs 9.

I claim:

1. A furring plate formed from sheet metal provided with parallel strands formed by parallel slits of uniform length all terminating at a line substantially at right angles to the length of said slits, said strands being immediately adjacent each other and provided with longitudinal beads, and portions of each of said strands being curved out of the general plane of the plate on both sides thereof.

2. A furring plate formed of sheet metal comprising a plurality of sections, each section having side frame portions and transverse, beaded frame portions, all of said frame portions lying substantially in a single plane, and the body of the plate lying intermediate said frame portions provided with slits extending from one transverse frame portion to the other and forming parallel strands, said strands provided with longitudinal beads and portions of each of said strands curved outwardly from the general plane of said frame portions.

3. A furring plate formed from sheet metal comprising a plurality of sections, each section having side frame portions and transverse frame portions, all of said frame portions lying substantially in a single plane and a body portion lying intermediate said frame portions, said body portion provided with slits parallel to said side frame portions, said slits forming parallel strands extending from one transverse frame portion to the other, said strands provided with longitudinal beads, portions of each of said strands curved out of the general plane of the plate on one side and other portions curved out of the general plane of the plate on the other side, and the portions of said strands curved out of the general plane of the plate having their lateral edges bent toward the general plane of the plate.

4. A furring plate formed from sheet metal provided with parallel strands formed by parallel slits, said strands provided with longitudinal beads, portions of each of said strands curved out of the general plane of the plate on one side and other portions curved out of the general plane of the plate on the other side, and the lateral edges of the said portions bent toward the plane of the plate.

5. A furring plate formed from a single sheet of metal and comprising a plurality of longitudinal series of formed sections, the various series being arranged side by side, strengthening ribs interposed between laterally adjacent series and the body of each section provided with longitudinally disposed strands formed by parallel, longitudinal slits, portions of each of said strands curved out of the general plane of the plate on one side and other portions curved out of the general plane of the plate on the other side.

6. A furring plate formed from sheet metal and comprising a plurality of sections arranged in a plurality of longitudinal series, said series arranged side by side, longitudinal main strengthening ribs formed by a fold of the sheet metal intermediate the various longitudinal series of sections and each section provided with parallel strands formed by parallel slits each parallel length arranged side by side and terminating in a single transverse line, portions of each of said strands curved out of the general plane of the plate on one side and other portions curved out of the general plane of the plate on the other side.

7. A furring plate formed from a single
sheet of metal and comprising a plurality of longitudinal series of formed sections, the various series arranged side by side, strengthening ribs interposed between laterally adjacent series, the sides of said strengthening ribs provided with spaced impressions, and the body of each section provided with longitudinally disposed strands formed by parallel, longitudinal slits, each strand formed with reverse curves and laterally adjacent portions of laterally adjacent strands oppositely curved.

In testimony that I claim the above, I have hereunto subscribed my name in the presence of two witnesses.

WILLIAM L. CALDWELL.

Witnesses:

WILLIAM H. MILLER,
IRENE LUTZ.