This invention relates to building constructions, and has reference more particularly to roof and floor constructions in which a metal plate is used for supporting overlying layers of construction material.

An object of this invention is to provide a metal plate of a particular shape suitable for use as a roof deck in supporting overlying layers of construction material.

Another object of the invention is to provide a metal plate of suitable shape for supporting a poured floor slab of cementitious material.

A still further object of the invention is to provide a roof deck construction having clip interlocking means and attaching means for overlying construction material; also to improve building constructions in other respects hereinafter specified and claimed.

Reference is to be had to the accompanying drawings forming a part of this specification, in which

Fig. 1 is a sectional, perspective view of our improved roof deck construction.

Fig. 2 is a plan view of one of the roof deck plates.

Figs. 3, 4 and 5 are sectional views through the roof deck plate, taken on lines 3–3, 4–4 and 5–5 respectively of Fig. 2.

Fig. 6 is a perspective view of one of our improved intermediate clips for interlocking with the deck plates and also attaching to the overlying layers of construction material.

Fig. 7 is a sectional, perspective elevation of the clips shown in Fig. 6 as applied to the roof deck, and

Fig. 8 is a sectional elevation of a modified form of plate used in the construction of floors.

The framework of a building may consist of channel beams 10 which support transversely extending roof purlins 11 which are preferably in the form of channel members having angle clips 12 riveted to the flanges and webs of the various channel members. The building beams 10 are usually placed at an angle to the horizontal with a slope equal to the desired pitch of the roof.

Our improved roof deck comprises a metal plate 13, preferably of steel, in which are formed a plurality of channels 14, in spaced, parallel relation, said channels being preferably few in number and spaced comparatively far apart so as to provide a deck plate 15 which for all practical purposes may be considered as substantially continuous over a roof. As shown in Figs. 3, 4 and 5, the centers of the channels 14 are preferably equidistant the entire length of each section of plate 13. These channels have upwardly extending legs 16 which are substantially parallel adjacent one end of the deck plate 13, said legs flaring only slightly outwardly to permit satisfactory rolling during the fabrication of said plate.

After the channels 14 have been rolled with substantially parallel sides, a rib 17 is rolled in substantially the center of each of the plate surfaces 15, said rib extending from one extreme end of the plate to a point materially short of the opposite end of the plate 13. The ribs 17 serve the purpose of drawing together the legs 16 of adjacent channels so that said legs flare upwardly at a substantial angle to the vertical, thus permitting the parallel legs of an adjoining plate to telescope snugly into the flared legs of a deck plate with the overlapping deck plate surfaces 15 in face to face abutting relation. The ribs 17 also serve to give longitudinal stiffness to the entire deck plate construction. By actual tests we have found that these ribs 17 make the deck plate in excess of 10% stiffer than it is without the formation of said ribs 17.

One edge of the deck plate 13 is provided with a downwardly extending flange 20, and the opposite edge of said plate is provided with a downwardly extending L-shaped channel 21. The flange 22 of one deck plate is adapted to nest in or interlock with the L-shaped channel 21 of the adjoining deck plate.

In order to secure the deck plate 13 to the purlin 11, we provide an attaching clip having a base portion 22 formed with bifurcated flanges 23 which may be attached by hammering around the upper flange 24 of the purlin 11. An upwardly extending
L-shaped hook flange 25 is formed on the clip base 22, and said hook 25 is arranged to engage over the L-shaped flange 21 formed on one edge of the deck plate 13. In order to interlock the deck plates together intermediate to purlins 11, we provide intermediate clips 26 each of which has an upwardly extending flange 27 and a downwardly extending flange 28 arranged to interlock with the flange 20 and channel 21 of adjoining deck plates. The clip 26 is provided with bifurcated ends 29 arranged to be bent upwardly about the channel flange 21, and is also provided with an upper flange 30 arranged to be bent over the top of the plate surface 15 so as to securely interlock the deck plates 13 one to the other.

Each of the intermediate clips is also preferably provided with an upwardly extending pointed prong 31 which is adapted to be pushed through an insulating board 32 which may preferably be wood fiber or other suitable insulating material. Before applying the insulating board 32 to the roof deck, said roof deck is preferably mopped with hot asphalt. The insulating board 32 is applied to the roof deck while the asphalt is still hot, so that when the asphalt cools down, the insulating board 32 will be firmly and adhesively attached to the upper roof deck surfaces 15. After placing the insulating board 32 in position, the upper ends of the prongs 31 are bent laterally on top of said board 32 to insure that said boards are firmly attached to the roof deck and cannot be lifted by cyclones or other extraneous forces. The upper surface of the boards 32 are preferably mopped with asphalt after they have been laid in position, and layers of roofing paper 34 or other desired protective covering may be applied to the upper surfaces of said boards 32, preferably in overlapping relation so that, at least, two layers of a roofing paper cover every point in the roof.

Our improved roof deck plate with suitable modification may be also satisfactorily used as a support for a poured floor slab of cementitious material. (Fig. 8.) For the construction of floors, channels 14a are formed in a deck plate 13a, said channels being preferably somewhat less in depth than the channels 14 of the roof deck. Ribs 17 are rolled in the floor plate 13a in the same manner as for the roof deck.

L-shaped channel flanges 35 are formed on one edge of the floor plate 13a, and said flanges 35 are preferably somewhat wider than the flanges 21 so as to give clearance for a channel shaped attaching clip 36 arranged to embrace the upper flange 37 of a bar joist, 38, or other suitable supporting frame work. An upwardly extending L-shaped hook flange 39 extends from the clip 36 and engages over an upwardly extending flange 40 formed along the edge of the deck plate 13a opposite the channel 35. The clip 36 may be attached to the T bar 37 in any suitable way such as by rivets 41, or it may be heavy enough to require no fastening. Intermediate clips, such as those shown in Fig. 6, are used to interlock the plate 13a intermediate to the bar joist 37, except that these intermediate clips are not provided with the prong 31. A slab 43 is poured on top of the floor plate 13a, and this slab may consist of Portland cement, gypsum or other desired cementitious material. After the slab 43 is dried, a finishing or topping surface 44 of linoleum, terrazzo or asphalt mastic flooring may preferably be applied to the top surface thereof to take the actual wear on the floor.

In manufacturing our improved roof and floor plates, a continuous rolling process is preferably used. The plate is first passed through rollers which form the flanges 20 and 21 and also form the channels 14 with substantially parallel sides. The partially formed plate is then run between rollers which are automatically and intermittently disengaged from the plate by mechanical or magnetic means during a portion of the travel thereof, so that ribs 17 do not extend along the entire length of each plate.

We would state in conclusion that while the illustrated examples constitute a practical embodiment of our invention, we do not wish to limit ourselves precisely to these details, since manifestly, the same may be considerably varied without departing from the spirit of the invention as defined in the appended claims.

Having thus described our invention, we claim as new and desire to secure by Letters Patent:

1. A roof deck construction comprising a plurality of plates having overlapping ends, each plate being provided with a plurality of spaced, parallel channels, the channels in the end of one plate engaging with those in the adjacent end of an adjoining plate, and ribs formed in each plate intermediate said channels and extending substantially the full length of said plate but terminating short of the one end thereof.

2. A roof deck construction comprising a plurality of plates having overlapping ends, each plate being provided with a plurality of spaced, parallel channels, the channels in the end of one plate engaging with those in the adjacent end of an adjoining plate, and spaced, parallel ribs formed in each plate intermediate said channels and extending from one end of each plate substantially the
full length of said plate but terminating short of the opposite end thereof.

3. A roof deck construction comprising a plurality of plates having overlapping ends, each plate being provided with a plurality of spaced, parallel channels, the channels in the end of one plate engaging with those in the adjacent end of an adjoining plate, the width of the plate between adjacent channels being materially greater than the width of each channel, and spaced, parallel, relatively shallow ribs formed in each plate intermediate said channels and extending from one end of each plate substantially the full length of said plate but terminating short of the opposite end thereof.

4. A roof deck construction comprising a plurality of plates having overlapping ends, each plate being provided with a plurality of spaced, parallel channels, the channels in the end of one plate engaging with those in the adjacent end of an adjoining plate and ribs formed in each plate intermediate said channels and extending from one end of each plate substantially the full length of said plate but terminating short of the opposite end thereof, the sides of said channels in the ribbed portion of said plate being flaring and the sides of said channels in the unribbed portion of said plate being substantially parallel to each other.

5. A roof deck construction comprising a plurality of plates having overlapping ends, each plate being provided with a plurality of spaced, parallel channels, the channels in the end of one plate engaging with those in the adjacent end of an adjoining plate, and ribs formed in each plate intermediate said channels and extending from one end of each plate substantially the full length of said plate but terminating short of the opposite end thereof, the sides of said channels in the ribbed portion of said plate being flaring and the sides of said channels in the unribbed portion of said plate being substantially parallel to each other, the flaring of said channels being adapted to laterally center the overlapping ends of the plates.

6. A roof deck construction, comprising a plurality of plates having overlapping ends, each plate being provided with a plurality of spaced, parallel channels, the channels in the end of one plate engaging with those in the adjacent end of an adjoining plate, the width of the plate between adjacent channels being materially greater than the width of each channel, and spaced, parallel, relatively shallow ribs formed in each plate intermediate said channels and extending from one end of each plate substantially the full length of said plate but terminating short of the opposite end thereof, the sides of said channel in the ribbed portion of said plate being flaring and the sides of the channels in the unribbed portion of said plate being substantially parallel to each other.

7. In a roof deck construction, a plurality of plates having overlapping ends, each plate being provided with a plurality of spaced, parallel channels, the channels in the end of one plate engaging with those in the adjacent end of an adjoining plate, the width of the plate between adjacent channels being materially greater than the width of each channel, and spaced, parallel, relatively shallow ribs formed in each plate intermediate said channels and extending from one end of each plate substantially the full length of said plate to a point somewhat short of the opposite end of said plate, said ribs being arranged to widen the surface width of one end of said channels so to permit the overlapping of said channel ends, said ribs being also arranged to impart longitudinal strength to said plates.

8. In a roof deck construction, spaced supporting elements, a plurality of plates having overlapping ends, arranged on said supporting elements, each plate being provided with a plurality of spaced, parallel channels disposed at right angles to said supporting elements, the channels in the end of one plate engaging with those in the adjacent end of an adjoining plate, the width of the plate between adjacent channels being materially greater than the width of each channel, sheets of insulating material superimposed upon and secured to said plates, and ribs formed in each plate intermediate said channels and extending from one end of each plate substantially the full length of the plate but terminating short of the opposite end thereof.

9. In a roof deck construction, spaced supporting elements, a plurality of plates having overlapping ends, arranged on said supporting elements, each plate being provided with a plurality of spaced, parallel channels disposed at right angles to said supporting elements, the channels in the end of one plate engaging with those in the adjacent end of an adjoining plate, the width of the plate between adjacent channels being materially greater than the width of each channel, sheets of insulating material superimposed upon and secured to said plates, and depressed relatively narrow ribs formed in each plate intermediate said channels and extending from one end of each plate substantially the full length of the plate but terminating short of the opposite end thereof.

10. In a roof deck construction, spaced supporting elements, a plurality of plates having overlapping ends arranged on said supporting elements, each plate being provided with parallel upwardly opening channels extending from the under side of the plate and disposed at right angles to said supporting elements, the channels in the end of one plate engaging with those in the ad-
jacent end of an adjoining plate, the width of the plate between adjacent channels being materially greater than the width of each channel. Sheets of insulating material superimposed upon and secured to said plates, and depressed relatively narrow ribs formed in each plate intermediate said channels and extending from one end of each plate substantially the full length of the plate but terminating short of the opposite end thereof.

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