E. C. STROEBE.

REINFORCING PLATE.

APPLICATION FILED JUNE 13, 1916.

1,287,507.

Patented Dec. 10, 1918.

2 SHEETS—SHEET 1.

Fig. 1.

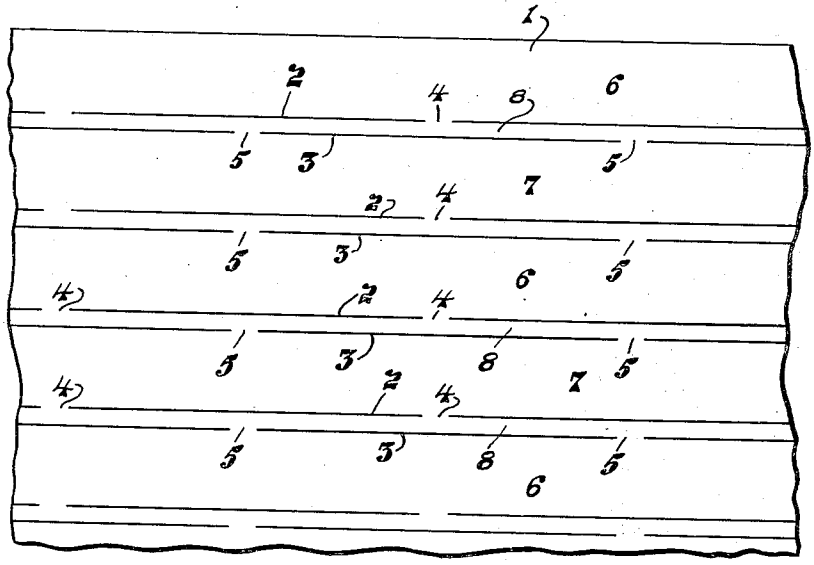


Fig. 2.

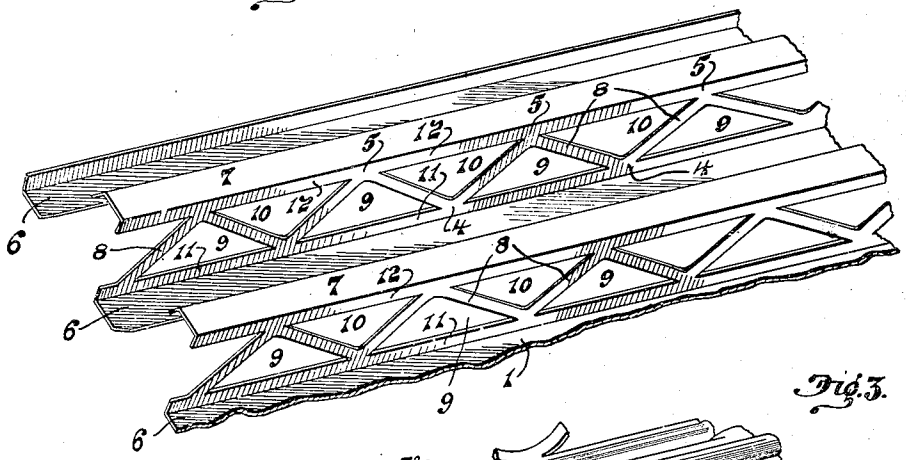
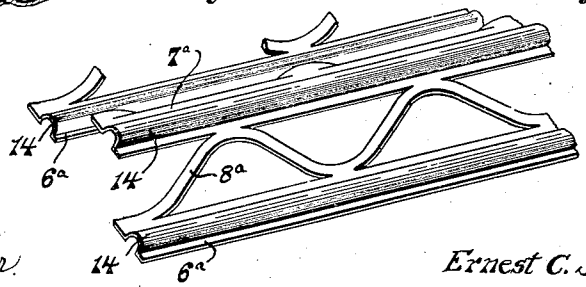


Fig. 3.



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2 SHEETS—SHEET 2.

Fig. 4.

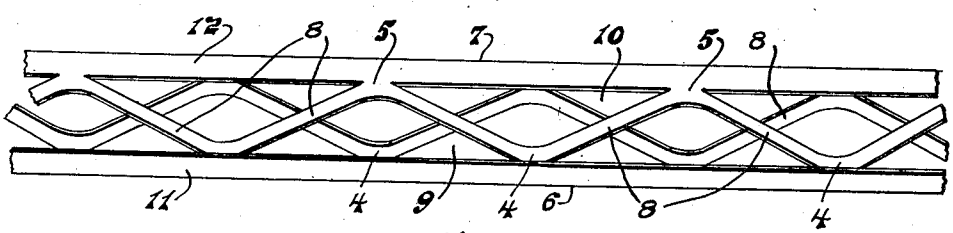


Fig. 5.

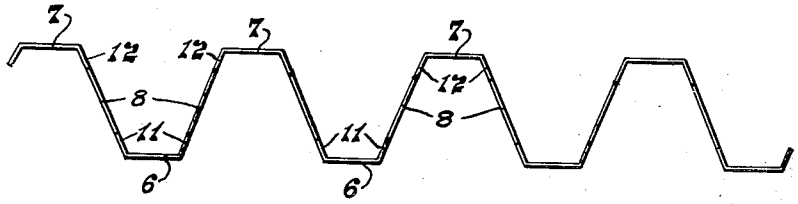


Fig. 6.

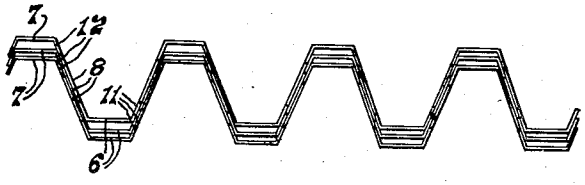


Fig. 7.

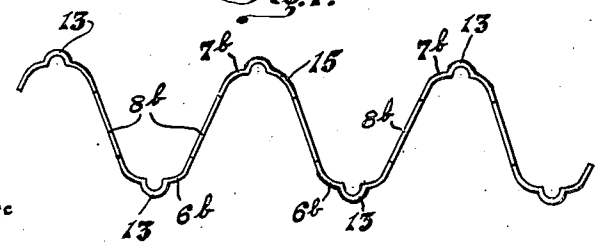


Fig. 8.

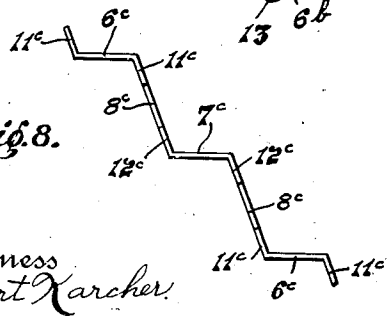
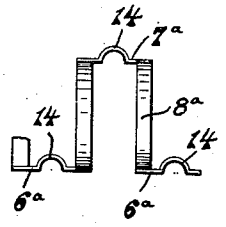


Fig. 9.



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UNITED STATES PATENT OFFICE.

ERNEST C. STROEBE, OF CANTON, OHIO, ASSIGNOR TO THE BERGER MANUFACTURING COMPANY, OF CANTON, OHIO, A CORPORATION OF OHIO.

REINFORCING-PLATE.

1,287,507. Specification of Letters Patent. Patented Dec. 10, 1918.

Application filed June 13, 1916. Serial No. 103,397.

To all whom it may concern:

Be it known that I, ERNEST C. STROEBE, a citizen of the United States, residing at Canton, in the county of Stark and State of Ohio, have invented a new and useful Reinforcing-Plate, of which the following is a specification.

My invention relates to improvements in reinforcing plates for concrete structures and the like and especially to such plates formed from sheet metal.

The objects of the invention are to generally improve reinforcing plates of the character described, to so construct the plate as to produce a large amount of finished product from a given quantity of sheet metal, to so form and dispose the parts of the plate as to obtain a very high degree of efficiency by properly distributing strains, locating the stronger parts where the greatest strains occur, and rendering possible the perfect embedding of the plate by forming the same with uniform and well distributed openings.

Further objects are, to so form the plate that it may be readily nested for storage and shipment and will not be easily injured in handling, the various parts serving to brace each other as well before being embedded as in the finished concrete or other structure.

These objects, together with other objects readily apparent to those skilled in the art may be attained by the construction illustrated in the accompanying drawings, although the invention may be embodied in other forms, the construction illustrated being chosen by way of example.

In the drawings:

Figure 1 is a plan view of a portion of a sheet of metal illustrating how the blank is slit or cut to form the finished reinforcing plate.

Fig. 2 is a perspective view of a portion of a reinforcing plate embodying the invention.

Fig. 3 is a perspective view of a portion of a modified form.

Fig. 4 is a side view of that form illustrated in Fig. 2.

Fig. 5 is an end view of the same.

Fig. 6 is an end view of three plates of the same form nested for shipment.

Fig. 7 is an end view of a plate embodying a second modification.

Fig. 8 is an end view of a third modification.

Fig. 9 is an end view of that modified form of plate illustrated in Fig. 3.

Throughout the several views similar reference numerals indicate similar parts.

More specifically describing the construction illustrated in said drawings, attention is first called more particularly to the blank illustrated in Fig. 1 in which the numeral 1 indicates a sheet of metal in which are arranged the slits 2 and 3, the slits 2 and the slits 3 being of equal length and the slits 2 being arranged in a plurality of parallel spaced lines, the ends of adjacent slits 2 in each line being spaced from each other as at 4. The slits 3 are arranged similarly to the slits 2, there being a line of slits 3 adjacent each line of slits 2 and the spaced ends of adjacent slits 3, as at the points 5, being arranged substantially intermediate the points 4.

In this way the chords 6 and 7 are separated by the comparatively narrow ribs 8 between the slits 2 and 3, the said ribs 8 being connected to the adjacent chords by the integral staggered connecting portions 4 and 5 heretofore mentioned.

In forming the reinforcing plate from the slitted blank, as described, the chords 6 are brought into a common plane laterally spaced from the chords 7, which chords are likewise in a common plane. The ribs 8, being connected by the integral portions at 4 and 5 as described, are bent diagonally and somewhat stretched producing triangular openings 9 between said ribs and the chords 6 and similar openings 10 between said ribs and the chords 7.

If desired the chords 6 and 7 may be provided along their edges with the integral marginal flanges 11 and 12, which are preferably disposed in inclined planes in which the intervening ribs 8 also lie. The flanges 11 and 12 thus strengthen the chords 6 and 7 and the integral attaching portions 4 and 5 connect the ribs 8 to the chords through said flanges.

If desired the chords 6 and 7 may be provided with embossed integral strengthening portions such as the bead 13 as illustrated in Fig. 7 or the head 14 in Figs. 3 and 9 and the flanges 11 and 12 may be formed in such manner as to join the body of the chord in a

rounded position as illustrated at 15 in Fig. 7 rather than in a line of more abrupt bending as illustrated in Fig. 2.

In either form of the plate as described, however it will be found that a plurality of completely formed plates will be very readily nested after the manner illustrated in Fig. 6, thus making it possible to store and ship large quantities of the plate in comparatively small space.

Fig. 4 is of especial interest as illustrating the staggered relation of the connecting portions 4 and 5, thereby producing a structure in which the strains are more thoroughly distributed and the efficiency of the plate is increased by reason of the bracing and bridging effects of the ribs 8 in their peculiar relation to each other and to the chords.

Fig. 5 is of interest in that it more fully illustrates how the ribs 8 lie in the same inclined planes as the flanges 11 and 12 to which they are connected. The plate when so formed is capable of supporting plastic concrete in a very satisfactory way even when the ribs 8 are considerably inclined for the reason that the flat sides of said ribs engage said concrete.

In the modification illustrated in Fig. 7 the chords 6^b and 7^b correspond to the chords 6 and 7 of the preferred form of construction hereinbefore described and the ribs 8^b are arranged in the inclined position so that the finished plate made in accordance with Fig. 7 may be very readily nested and is strong and substantial.

In the modification illustrated in Fig. 3 the ribs 8^a are not inclined in the same manner as the ribs 8 and 8^b and from an inspection of Fig. 9 illustrating the same form it will be noted that the finished product will be substantially of the same projection as the sheet metal blank from which it is formed, the edges of the chords 6^a and 7^a being laterally separated from each other so that the finished product will be substantially of the same projection crosswise the sheet, as the sheet metal blank from which it is formed, the edges of the chords 6^a and 7^a being laterally separated from each other by only the thickness of the ribs 8^a. The chords 6^a and 7^a may be provided with the beads 14 either extending in the same direction as illustrated in Figs. 3 and 9 or in the opposite direction in a manner corresponding to the opposite disposition of the beads 13 in Fig. 7.

Attention is also called to Fig. 8 wherein the chords 6^c and 7^c are arranged in stepped relationship, the chords 6^c lying in different planes and the chords 7^c also lying in different planes. The ribs 8^c and the flanges 11^c and 12^c however are provided, either as shown or as in Fig. 3, the two flanges at the opposite sides of each chord extending in opposite directions. This form of reinforcing plate is especially valuable on roofs or other inclined work where it is desired to maintain the chords in substantially horizontal positions to support the plastic concrete.

It will be understood that reinforcing plates embodying my invention may be used for a variety of purposes, especially in the construction of building and the like. The plate may be used in vertical horizontal or inclined position may be made of various dimensions, from a comparatively narrow, elongated form adapted to take the place of studding in fire proof constructions to a sheet of large area, or a plurality of such sheets adapted to reinforce concrete slabs, ceiling, walls, floors, roofs and the like.

In the construction of heavy concrete slabs adapted to support considerable weight it should be noted that when the plastic concrete is applied to the reinforcing plate, said plate being utilized to support the weight of said plastic concrete, the lower chord of the plate will constitute the tension chord, while the upper chord will constitute the compression chord of the bridged construction. As soon as the concrete slab has hardened the upper portion of the concrete slab will take up the compressive force and both upper and lower chords of the reinforcing plate will act as tension members in the finished concrete structure.

One of the points of importance to be noted is that all of the forms described are made from substantially the same blank, that is, the arrangement of the slits 2 and 3 is substantially the same for all the various forms of plates, the distance between said slits, the distance between successive rows of slits and the length of the slits varying in accordance with the dimensions of the completed plate desired.

While I have thus described my invention with reference to the specific forms to which attention has been called the same being the best forms in which I have yet contemplated embodying the invention I desire to be not limited to the details of form and construction thus disclosed for it is obvious that many changes may be made as circumstances require or experience suggests without departing from the spirit of the invention within the scope of the appended claims.

I claim:

1. A reinforcing plate formed from sheet metal and comprising a series of elongated chords alternate chords lying in the same plane, an integral flange formed upon either edge of each chord, the said flanges extending in the direction of the next adjacent chord, ribs formed integral with the said flanges and chords and lying in the same plane as the said flanges the said ribs connecting adjacent chords.

2. A reinforcing plate formed from sheet metal and comprising spaced chords lying in different planes alternate chords lying in the same plane, inwardly extending flanges formed integral with each chord at the edge thereof, ribs formed integral with the said flanges and chords and lying in the same plane with the said flanges and connecting adjacent chords.

3. A reinforcing plate formed from a single sheet of metal comprising elongated spaced chords lying in opposite planes alternate chords lying in the same plane, downwardly extending flanges formed integral with each chord in one plane upwardly extending flanges formed integral with each chord in the opposite plane, the said flanges extending toward each other and ribs formed integral with the flanges lying in the same plane and connecting adjacent chords in opposite planes.

In testimony that I claim the above, I have hereunto subscribed my name.

ERNEST C. STROEBE.