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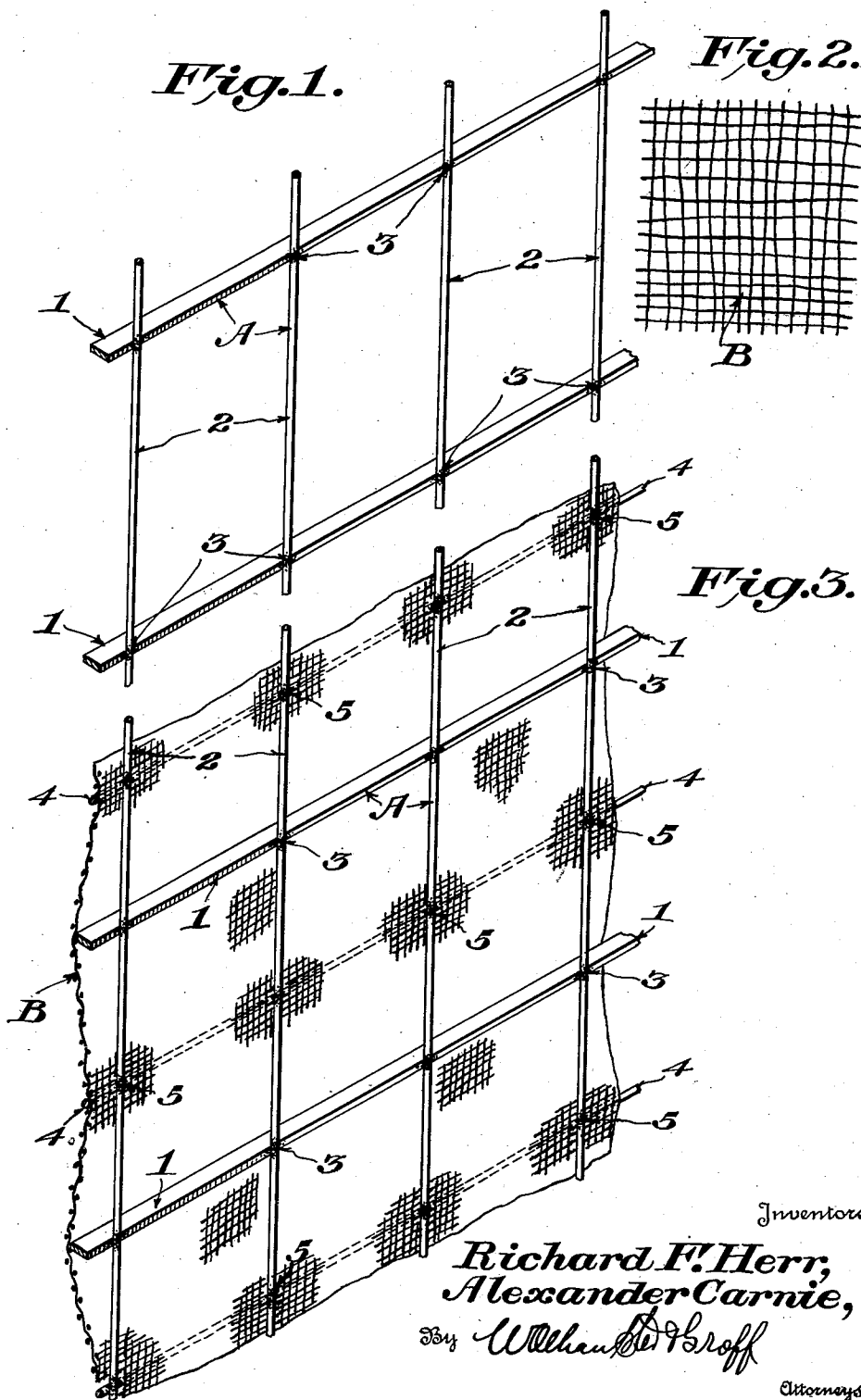
R. F. HERR ET AL

2,298,376

CLOTH BACKED PLASTER REINFORCING

Filed June 26, 1940

3 Sheets-Sheet 1



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Fig. 4.

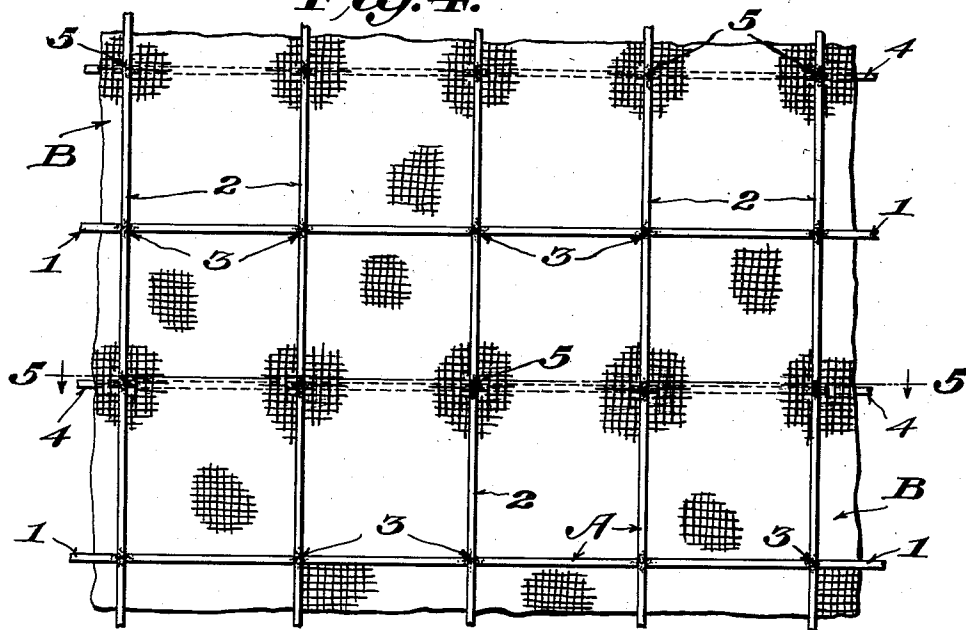


Fig. 5.

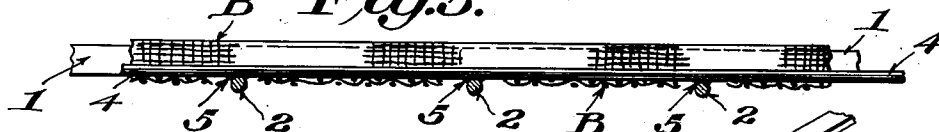


Fig. 6.

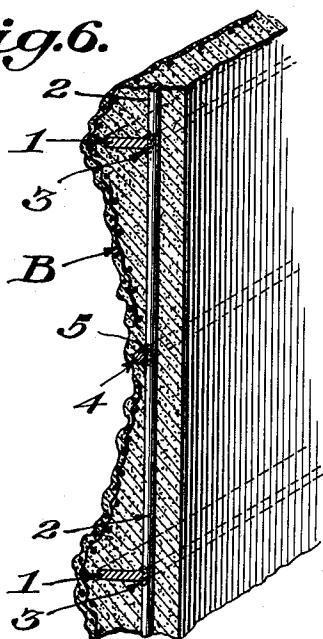
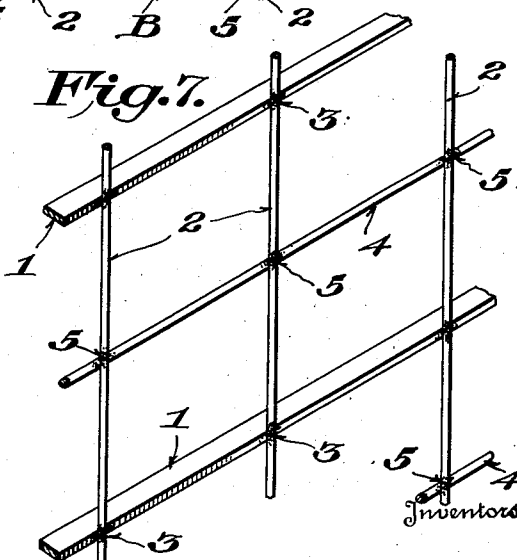


Fig. 7.



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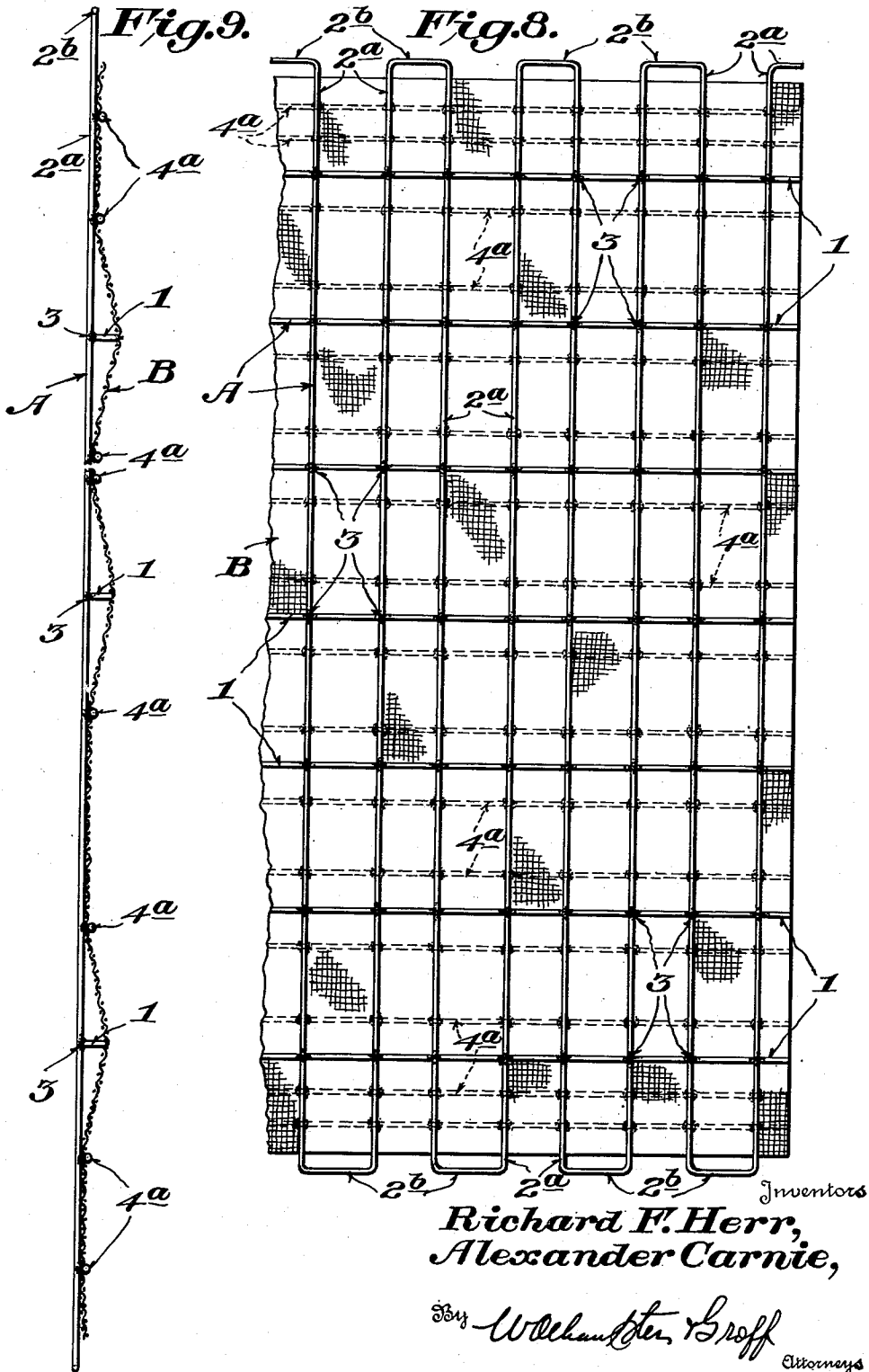
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UNITED STATES PATENT OFFICE

2,298,376

CLOTH BACKED PLASTER REINFORCING

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Application June 26, 1940, Serial No. 342,558

5 Claims. (Cl. 72-116)

This invention relates to plaster reinforcing used in forming plaster walls or the like, and has primarily in view a novel method of production, and a resulting improved construction having special advantages from both the standpoint of manufacture and use.

Metal lath of various types, particularly expanded metal has long been used in constructing plaster walls, ceilings and the like and, notwithstanding its recognized superior characteristics for the purpose, has left room for improvement in several respects, more particularly in the way of a construction for avoiding plaster waste; reduction in weight per square yard; and economy in price.

It was appreciated at an early date that considerable plaster waste occurred in erecting walls when the openings in the mesh were large. This objection developed many expedients such as stiffening the consistency of the rough coat, or using larger quantities of hair, as well as various forms of technique and skill in applying the plaster to the bare lath. Subsequently, the meshes were made smaller which partially answered the problem of plaster waste. Later, the mesh was backed up by paper to prevent an excessive amount of plaster from passing through the openings in the mesh. These added expedients, while satisfactorily reducing the bulk of the waste, nevertheless offered no aid in reducing the weight per square yard and consequently the cost of the lath. For the latter reason, although expanded metal is preferable, it has not been competitive in cost with various forms of wall board and plaster board which are recognized as constituting the bulk of the low price lathing field.

Sheet metal stock of suitable gauge for the expanded product is usually regarded from the standpoint of cost in terms of weight or tonnage, and naturally the base price of steel is a controlling factor in the ultimate cost of the lath. That is to say, in order to obtain expanded lath of adequate strength, certain limits as to weight of the basic stock are necessarily reflected in the final expanded product in terms of cost per square yard. For example, the average weight of expanded metal lath per square yard is 3 lbs. and the cost of the base metal plus cost of fabrication determines the price. Expanded metal lath weighing approximately $2\frac{3}{4}$ lbs. is about the lightest metal lath that is used under ordinary conditions, and as a matter of fact, the greatest volume of expanded metal lath is confined to weights of 3 lbs. and over. One effort to lower the cost has been to use lighter base stock so that

lath is available on the market today weighing only 2.2 lbs. per square yard and 2.5 lbs. per square yard, which because of its lighter weight is less expensive, but, at the same time, lath made from very light gauge material is very flimsy and therefore seldom used. While in itself this light weight type of lath is a partial solution of the problem of low cost metal lath, nevertheless, it is not regarded as sufficiently strong, nor is it competitive in price with non-metallic lathing, such as wall board, plaster board and the like. It may also be noted that, ordinarily, heavy metal reinforcement is out of proportion to the object or result to be attained because when the plaster is once set, a much smaller amount of steel will furnish sufficient reinforcement to assure the rigidity of the wall.

In the case of expanded metal lath, or other metal lath backed with paper, the moisture from the plaster is prevented from evaporating from the back of the lath by the paper, thus causing an unfavorable condition which often results in damage to the plaster. Furthermore, paper sheets ordinarily do not provide an adequate multiple key lock between the plaster and the paper but rather depend on adhesion of the plaster to the paper for the bond. In practice, this bond while usually adequate for side walls has proved too weak for convenient use on ceiling work and has thus made it difficult and in fact impractical to use paper backed lath on ceilings. While it has also been proposed to provide slots or openings in the paper to form mechanical keys, nevertheless where such slots or openings are provided in sufficient quantity to obtain adequate distribution of keys, the result so far as plaster waste is concerned is approximately the same as that existing in connection with expanded metal, or, on the other hand, the backing is unduly weakened.

The present invention has primarily in view the provision of a plaster reinforcing of maximum lightness, that is, not only equal in strength and stiffness to heavier expanded metal lath with comparable efficiency, but which also avoids plaster waste; affords uniform drying; and insures the formation of mechanical keys between the plaster and the backing. For example, reinforcing according to the present invention, even with a backing, weighs approximately only 1.5 lbs. per square yard. This is a material and substantial saving in weight without sacrificing strength, stiffness, or reinforcement qualities, and, at the same time, effecting considerable economy of price, to say nothing of greater fa-

cility and less expense in shipping, handling and installation.

A further object of the invention is to provide a novel metallic reinforcing mesh or grid which is extremely light and yet equally as strong, and in many cases, stronger than much heavier expanded metal lath, and capable of an equally wide or wider range of general application and use.

Another object of the invention is to provide a foraminous sheet, preferably a sized fabric cloth which may be used not only as a backing for the novel grid or reinforcing structure above referred to but which is capable of general application to any metal lath which will serve as a grid or supporting frame therefor. That is to say, it is proposed to provide a fabric having meshes within a given size range which is light, offers ample opportunity for mechanical keys of the plastic material, and does not impede drying.

A further and more specific object of the invention is to provide a composite reinforcing including a metallic grid of the type set forth which can be readily fabricated so as to incorporate a fibrous cloth mesh sheet of the class described. Thus, while the components of the invention are susceptible of individual uses in related fields they are of special utility in a plaster reinforcing to provide sufficient rigidity to make plastering easy and of sufficient strength to hold the wet plaster as it is applied; prevent plaster waste; provide a mechanical key between the plaster and the backing in addition to affording the keying of the plaster about the metal, mesh, or grid itself; and also provide a strong reinforcement for the plaster after it has hardened.

With the above and other objects in view which will more readily appear as the nature of the invention is better understood, the same consists in the novel construction, combination and arrangement of parts hereinafter more fully described, illustrated and claimed.

The preferred and practical embodiment of the invention is shown in the accompanying drawings, in which:

Figure 1 is a perspective view illustrating the initial stage of the main grid constructed in accordance with the present invention.

Figure 2 is an enlarged fragmentary plan view of a portion of a sized fabric sheet susceptible of use as a backing for plaster reinforcing.

Figure 3 is a perspective view similar to Figure 1 illustrating the step of applying the fibrous sheet to the partially formed grid.

Figure 4 is a plan view of a completed plaster reinforcing incorporating both components of the present invention.

Figure 5 is a sectional view taken on the line 5-5 of Figure 4.

Figure 6 is a detail fragmentary perspective view showing the plaster reinforcing embodied in a plaster wall coat.

Figure 7 is a detail perspective view of the grid without the fibrous backing.

Figure 8 is a plan view of a modified form of plaster reinforcing shown in Fig. 3 and illustrating the transverse wires provided with looped ends.

Figure 9 is a side elevation of the modified form of plaster reinforcing shown in Fig. 8.

Similar reference characters designate corresponding parts throughout the several figures of the drawings.

In constructing plaster reinforcing according

to the present invention the first step involves the fabrication of the main mesh or grid A which consists essentially of a plurality of relatively deep stiffening and reinforcing ribs 1 arranged in spaced parallel relation and intended to be disposed horizontally when installed in a wall. These ribs are connected by a plurality of transverse or vertical wires 2 which are electrically bonded or otherwise suitably secured as at 3 to the outer edges or faces of the ribs 1. The said ribs 1 may be made either by rolling suitable gauge wire into flattened formation or may be slit from strips. When required, the edges of the ribs may be smoothed by rolling down or otherwise removing the burrs and rough spots. In any event, the ribs 1 because of their substantial depth as compared with their width, and being disposed perpendicular to the plane of the grid produce a structure of great stiffness. The ribs 1 act as beams not only to resist pressure during the application of the plastic coat, for example, but impart the required rigidity to the grid when erected or installed and also act as a reinforcing rod or bar when embedded in an initially plastic material. The strength of the ribs 1 is substantially augmented in the completed structure by the transverse facing wires 2 welded to the outer edge thereof. That is to say, due to the bridging effect of the transverse wires 2, special strength is imparted to the ribs which prevents buckling or bending and also distribute the strain and the load throughout the grid.

The cloth element B shown in Fig. 2 is preferably a suitable coarse mesh woven fabric, such for example, as sized tobacco cloth, unbleached crinoline or the like which presents a multiplicity of openings. For example, it has been found that thread counts producing meshes approximately within the range of one hundred to three hundred and sixty openings per square inch are most practical for the purpose. That is to say, on one hand thread counts as low as 10/10 are practical and on the other, thread counts as high as 20/18 may be satisfactory to provide a good type of mechanical key and at the same time serve as an adequate plaster retainer. However, mesh having a 14/14 thread count has been found most practical and gives excellent results. Lower thread counts producing larger meshes result in waste of plaster, while fabric of higher thread counts is not only too expensive but does not allow enough plaster to pass through to form a proper key. Ordinary unsized cloth known to the trade as "Grieg Goods" has been found unsuitable for plastic keying, but as previously indicated, sized cloth of the type described may be used as a backing for ordinary expanded metal lath with good results where the cost of the ultimate product is not a factor. In any event, it provides a very satisfactory backing for any reinforcing grid.

The woven fabric sheet B may be incorporated with the main grid A by placing the sheet across the back of the ribs and then placing holding wires at the back of the sheet so as to press the sheet at intervals against the transverse wires 2 between the ribs 1-1. That is to say, the cloth backing B may be held to the main grid A by placing wires 4 at the back of the sheet and pressing the same over the back edges of the ribs 1. Where the longitudinal backing wires 4 cross the transverse facing wires 2, the same may be electrically welded together as indicated at 5 thus securely clamping the fibrous woven sheet

B between the crossing wires 2 and 4, and holding the grid and the cloth backing in finished assembled relation. Often the weld is made through one of the mesh openings. However, should a thread interfere, the heat generated during the electric welding of the wires 4 to the wires 2 burns the thread so that the metallic portions of the wires become securely united by welding. Due to the extremely short time interval of forming the electric weld between the wires 2 and 4, the cloth either is not burned at all or merely becomes burned away at the location of the weld so that, in practice, the resulting perforation is little or no larger than the mesh of the sheet.

When the plaster reinforcing is completed in accordance with the foregoing procedure, it is then ready for installation. It may be applied to studding in the conventional manner by nailing, wiring, stapling, or any other well known expedient, and furthermore during erection, permits the erector to readily see the stud locations.

Upon the application of plaster in the usual way to the plaster reinforcing, the load carrying ribs 1 are completely enclosed in plaster, as shown in Fig. 6. Under pressure of plaster application, the cloth backing sheet stretches sufficiently to permit the plaster to work behind the ribs and even the longitudinal holding or backing wires 4 often become enveloped in the plaster coat. The plaster also becomes keyed in the mesh of the fabric so that a mechanical bond is effected between the plaster and the backing sheet, thus, securing a definite mechanical key between the backing sheet and the plaster which is far superior to a mere adhesive bond as in the case of paper and permits of the present reinforcement being used in ceilings. The fabric backing absorbs but little moisture from the plaster, and since it allows the air to circulate and moisture to escape, proper drying of the plaster both inside and out readily occurs, and the whole plaster coat dries evenly, without warping, buckling, rotting or cracking.

Figs. 8 and 9 illustrate a modification of the invention wherein certain changes are made in the transverse wires which hold the fabric mesh to the back of the transverse wires.

Referring to Fig. 8, it will be observed that the transverse wires 2^a are preferably formed from a single wire which is looped at opposite sides as indicated at 2^b. In other words, the transverse wires 2^a, for manufacturing and practical reasons, may be formed of a continuous wire consisting of parallel sections within the area of the plaster reinforcing which perform the same functions as the transverse wires 2 in Fig. 3. Not only is the speed of the manufacturing and assembling operation increased by using this type of transverse wires, but at the same time, the completed plaster reinforcing is easier to handle for the reason that no cut ends of individual wires project at the sides of the plaster reinforcing thus avoiding a tendency of one section of plaster reinforcing to hook into the fabric of the adjoining section or sheet when stacked. Furthermore, the rounded or looped ends between the transverse wires make it easier to handle from the standpoint of avoiding injury to the erector's hands.

As will be seen from Fig. 8 as well as Fig. 9, it is desirable to use a pair of longitudinal wires 4^a between each of the ribs 1, in other words, two backing wires rather than one, as shown in Fig. 3. While the plaster reinforcing with one backing

wire between the ribs is satisfactory, nevertheless in applying the plaster to the plaster reinforcing, the plasterers in applying the wet plaster usually move their trowel in a direction at right angles to the heavy ribs. The plaster striking against these ribs is deflected backward and therefore the heaviest pressure against the fabric occurs adjacent the heavy longitudinal ribs. In order to resist this pressure successfully with the lightest possible cloth, it is desirable to place the backing wires relatively close to and on either side of the heavy ribs; thus there is very little tendency for the flat section of the cloth stretched between the two backing wires and in between the ribs to bulge. This is explained by the fact that the pressure which causes bulging is not primarily the pressure of the trowel on the plaster, but rather a secondary pressure which is incident to the plaster being deflected from the rib.

It will, of course, be understood that the plaster reinforcing is secured to the studding with the cloth side of the flat rib against the stud. Since between the studs the cloth is pulled up even with the top face of the flat rib, a slight plaster saving is accomplished due to the fact that the thickness of the plaster when specified is measured from the inside face of the stud to the inside face of the finished plaster.

From the foregoing, it will now be apparent that the present invention makes it possible to provide a light but strong metal plaster reinforcing which is not only competitive with plaster board and other cheap lath, or lath substitutes, but also provides, by reason of the fibrous cloth backing, the desirable qualities of securing a mechanical bond between the backing and the plaster, while, at the same time, affording uniform drying of the plastic coat.

It will, of course, be understood that minor changes in the invention may be resorted to within the scope of the appended claims.

We claim:

1. A plaster base and reinforcement for walls, ceilings and the like, comprising, a metallic grid including spaced ribs of flat substantially rectangular cross section disposed perpendicular to the plane of the face of the grid and a plurality of facing wires arranged in spaced relation transversely of the front edges of said ribs and welded thereto at their points of crossing to provide a substantially rigid metallic network; a fibrous sized woven mesh backing sheet normally loosely engaging the rear edges of the ribs, and backing wires located at the rear of the grid and disposed between and parallel to the ribs for stretching said non-metallic sheet over the ribs, said backing wires being welded to the rear of the facing wires through the non-metallic sheet.

2. A plaster base and reinforcement for walls, ceilings and the like, comprising, a metallic grid including spaced ribs of flat substantially rectangular cross section disposed perpendicular to the plane of the face of the grid and a plurality of facing wires arranged in spaced relation transversely of the front edges of said ribs and welded thereto at their points of crossing to provide a substantially rigid metallic network; a fibrous sized woven mesh backing sheet arranged over the rear edges of the ribs, and means for securing said sheet to the rear side of the facing wires about the rear edges of the ribs.

3. The method of making a plaster base, which consists in first forming a main grid by welding facing wires across the short related edges of a

plurality of spaced ribs of flat substantially rectangular cross section, applying a sized open mesh cloth backing sheet over the rear of the grid to loosely engage the rear edges of the ribs, applying backing wires to the rear surface of the fibrous sheet at points between the rib locations and at substantially right-angles to the facing wires, and then electrically welding the backing wires and the facing wires at their points of crossing through the said fibrous sheet.

4. A structure for lathing or analogous use, comprising in combination, a substantially rigid metallic reinforcing mesh consisting of spaced ribs of flat substantially rectangular cross section disposed perpendicular to the plane of the face of the mesh and a plurality of facing wires arranged in spaced relation transversely of the front edges of said ribs and welded thereto at their points of crossing, a backing sheet consist-

ing of a sized woven fibrous thread fabric having openings approximately within the range of 100 to 360 per square inch, and means for securing said backing sheet to the rear side of said mesh.

5. A structure for lathing or analogous use, comprising in combination, a substantially rigid metallic reinforcing mesh consisting of spaced ribs of flat substantially rectangular cross section disposed perpendicular to the plane of the face of the mesh and a plurality of facing wires arranged in spaced relation transversely of the front edges of said ribs and welded thereto at their points of crossing, a backing sheet consisting of a sized woven fibrous thread fabric having a thread count of 14 by 14 to the square inch, and means for securing said backing sheet to the rear side of said mesh.

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