March 14, 1967 W. B. GOLDSWORTHY 3,308,591

EXPANDED METAL WITH PAPER BACK

Filed July 24, 1964 5 Sheets-Sheet 1

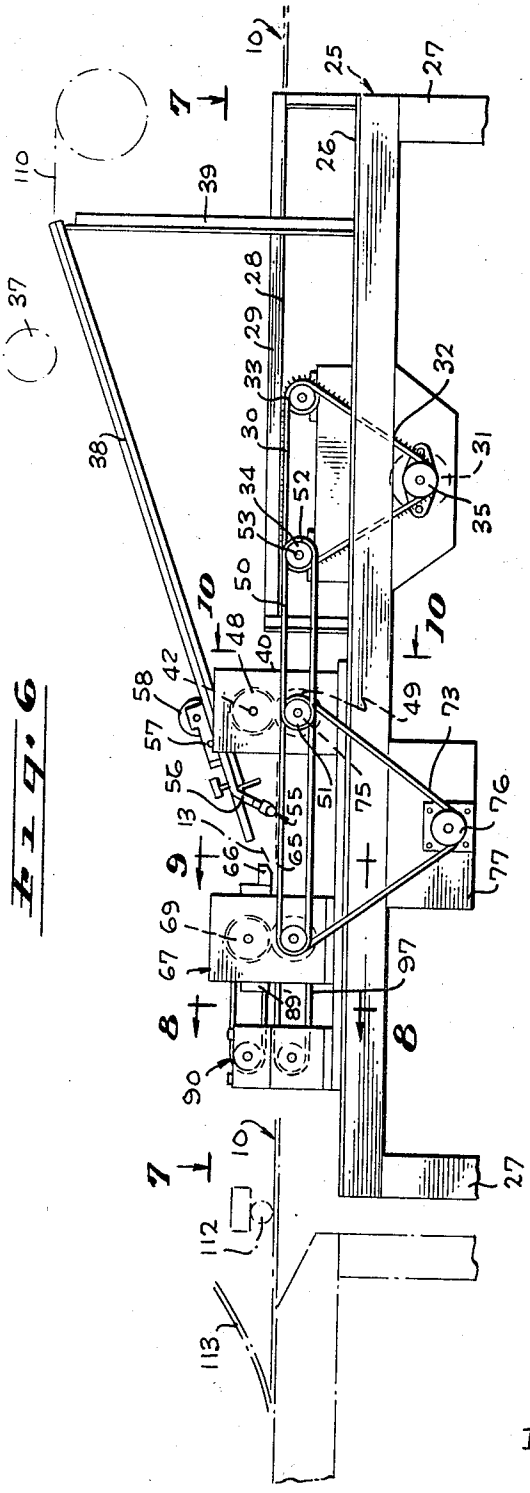


Fig. 6

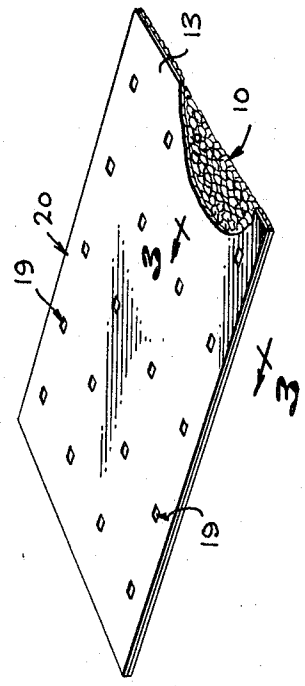


Fig. 7

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Fig. 2

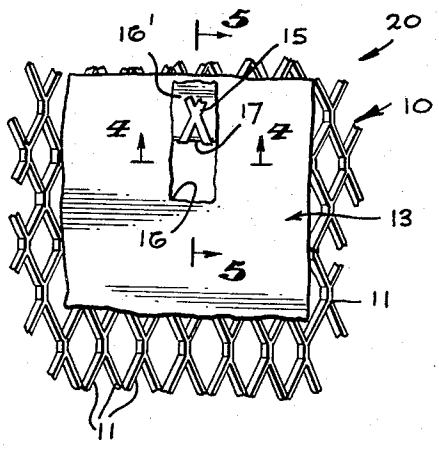


Fig. 5

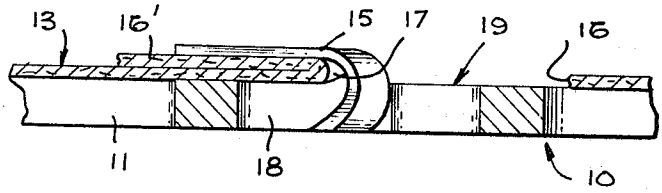


Fig. 4

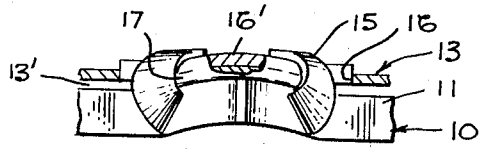
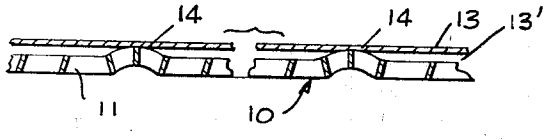


Fig. 3



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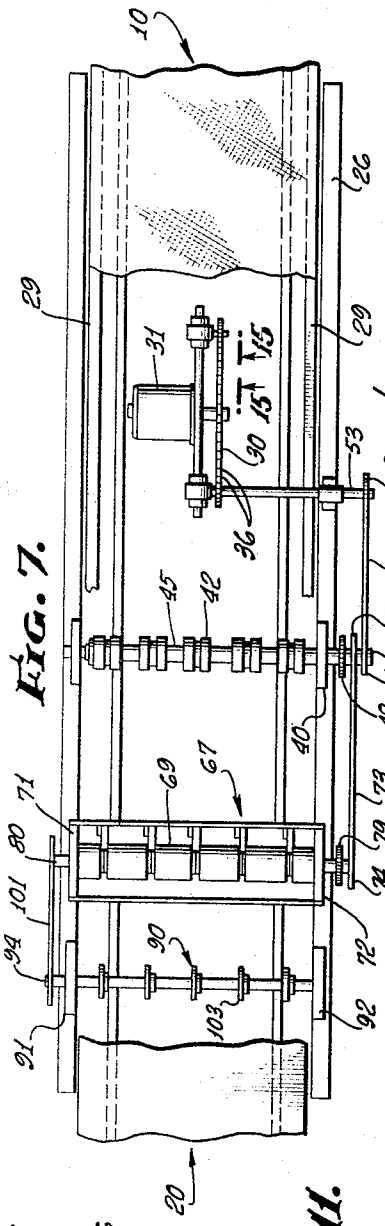


FIG. 7.

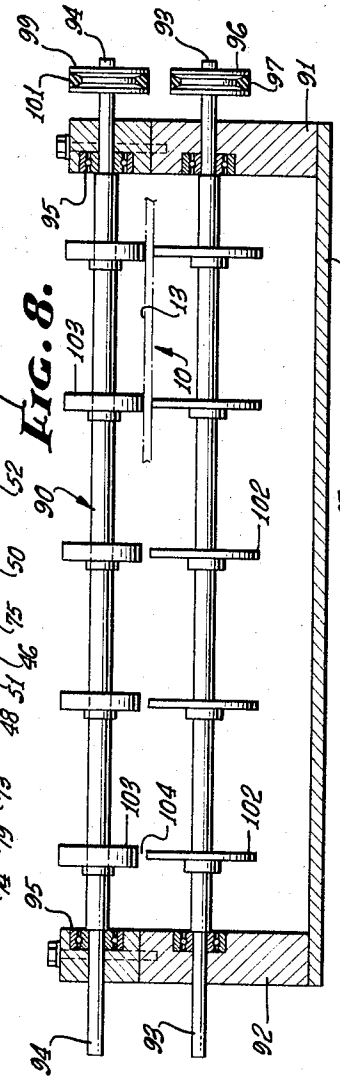


FIG. 8.

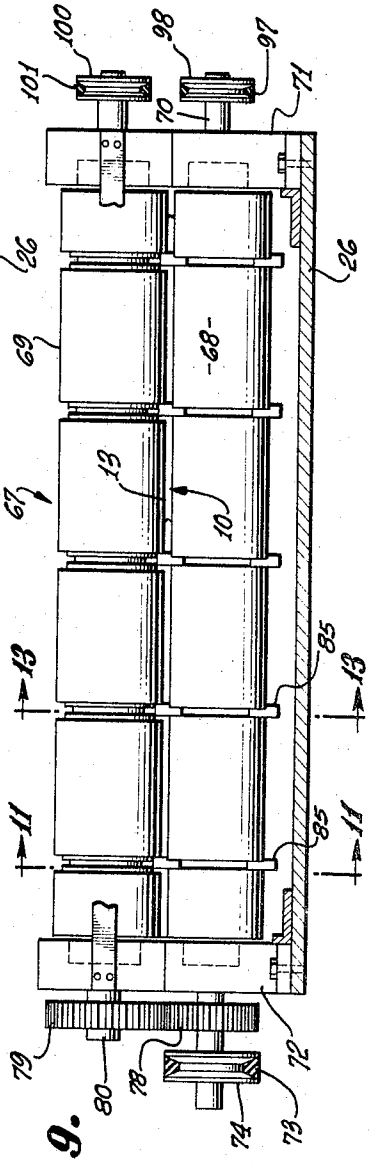


FIG. 9.

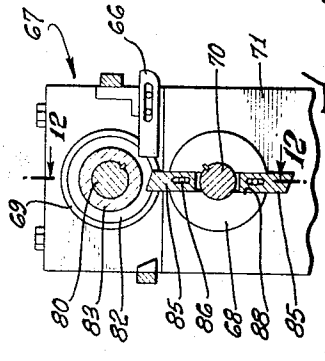


FIG. 11.

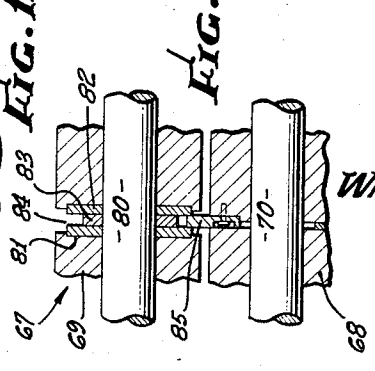


FIG. 12.

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FIG. 10.

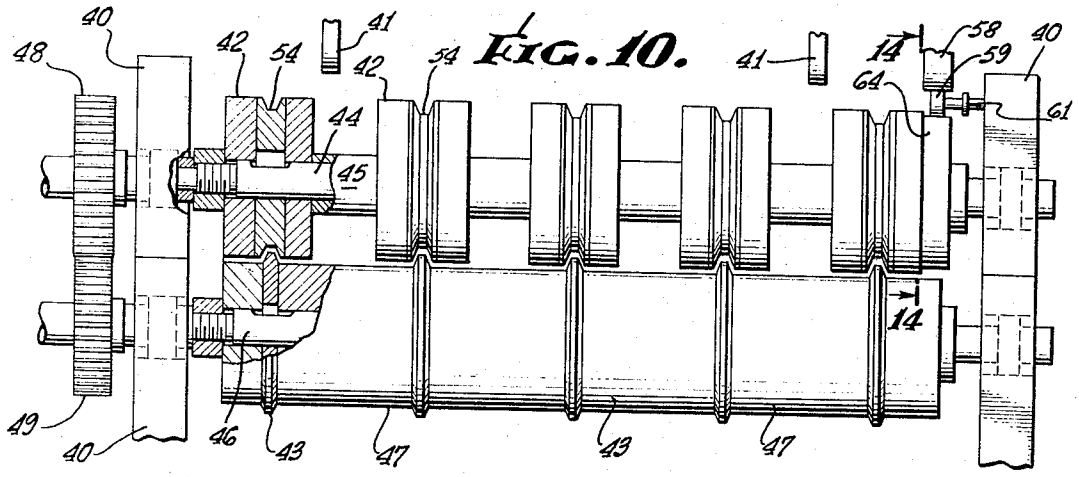


FIG. 13.

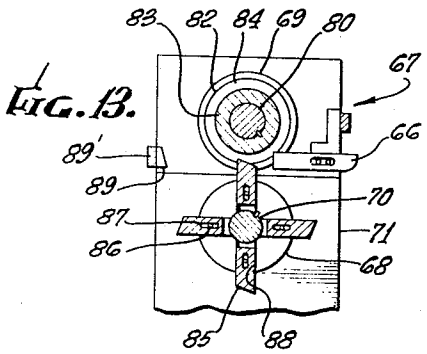


FIG. 14.

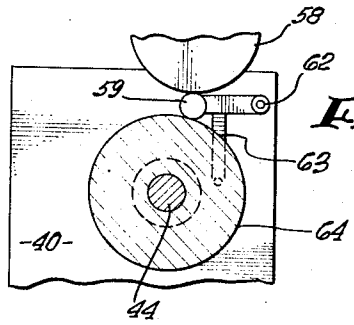


FIG. 16.

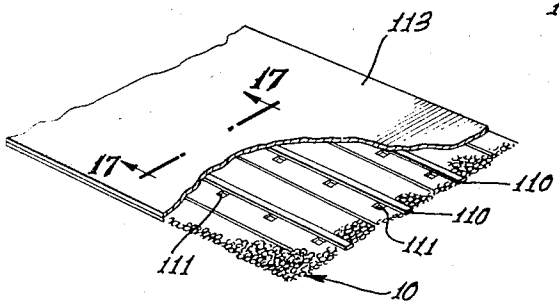


FIG. 17.

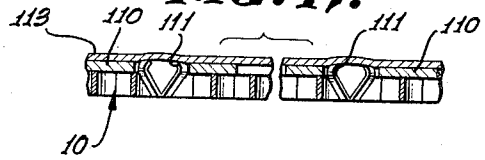
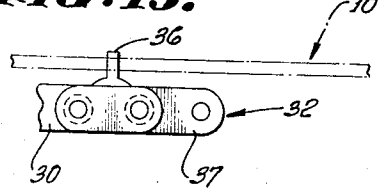


FIG. 15.



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EXPANDED METAL WITH PAPER BACK

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Fig. 18

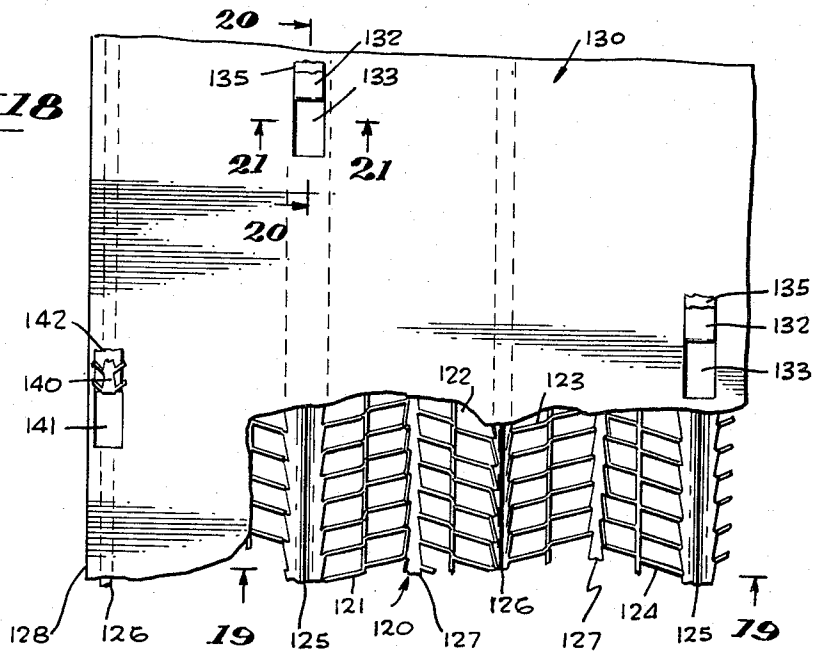


Fig. 19

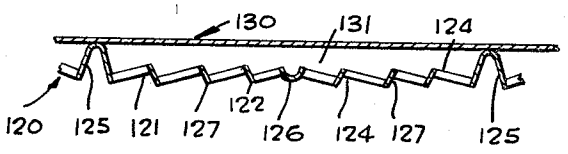
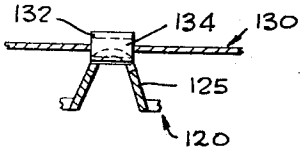


Fig. 21



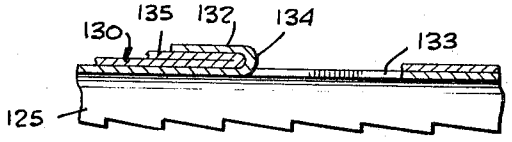


Fig. 22

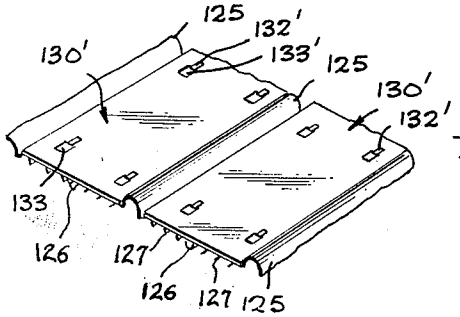


Fig. 20

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United States Patent Office 3,308,591 Patented Mar. 14, 1967

3,303,591

EXPANDED METAL WITH PAPER BACK

William Brandt Goldsworthy, 1230 Monterey Pass Road, Monterey Park, Calif. 91754

Filed July 24, 1964, Ser. No. 385,026
8 Claims. (Cl. 52—454)

This is a continuation-in-part of application Serial No. 184,111, filed April 2, 1962, now Patent No. 3,116,838. The invention relates to expanded metal and more particularly to expanded metal having a backing or coating of some kind so that the depth of plaster or other material which is applied thereto can be limited to an extent.

The most common expedient employed in recent years for application of the familiar stucco to a building wall is to nail over the area an expanse of expanded metal or expanded metal lath and to trowel the mortar over the expanded metal lath, pressing it through the holes, so that the mortar keys in place. Ordinarily, when a building wall is to be finished in this fashion, some form of paper, at times waterproof but sometimes merely insulating paper, is first tacked to the sheeting and then the expanded metal is nailed in place over the paper. On some occasions furring strips are applied to the surface and the expanded metal attached thereto but on other occasions where building codes permit, the expanded metal may be nailed or tacked directly to the surface structure. This expedient has worked substantially satisfactorily in the past where troweling has been depended upon to apply the mortar. This has been true whether the mortar is conventional plaster or whether it is in the form of a cement mortar which ultimately sets up like concrete. By following this procedure, the craftsman has been able to determine the amount of depth of mortar applied to the expanded metal to a sufficient degree by controlling the pressure which is used to trowel the material into place.

More recently there has been considerable resort to spraying on mortar which has been prompted to a large degree by the success experienced by a spray-on process for concrete frequently identified as the "Gunite" process.

When spray-on techniques are employed for applying plaster, mortar and concrete as mentioned, the depth and quantity of the applied material cannot be as readily controlled partly because of the fact that the force of the spray tends to drive the material well behind the expanded metal, filling up areas behind the metal to an unnecessarily great degree. This is particularly true when the surface over which the expanded metal is applied is a rough surface or one full of cracks, voids and spaces of various kinds. The difficulty is especially prevalent where the expanded metal is fastened to furring strips under which circumstance the spray-on technique is virtually prohibitive.

It is therefore among the objects of the invention to provide a new and improved expanded metal sheet whereby there is fastened to the expanded metal a thin sheet of inexpensive material impervious to the penetration of mortar, plaster and grout, by virtue of which the quantity of such material applied to the expanded metal is very definitely limited.

Another object of the invention is to provide a new and improved composite sheet of expanded metal and backing which incorporates a backing of such modest cost as to increase the over-all cost of the expanded metal and its application to a very minimum degree but at the same time provide a very substantial saving in the amount of material which is applied to it, especially by means such as spraying technique.

Still another object of the invention is to provide a new and improved composite expanded metal material incorporating expanded metal and a relatively impervious

backing such that the composite material need not comprehend more than the materials themselves without need for the employment of auxiliary fastening means to connect the sheets together.

Still further among the objects of the invention is to provide a new and improved composite expanded metal material whereby a backing can be provided for the metal portion which is moisture-proof or, in any event, moisture-resistant, and fastened fairly snugly against the expanded metal portion so that even though the composite material be attached to a structure wherein there is no substantial backing for the expanded metal, a limited though sufficient quantity of mortar, plaster or grout can be applied thereto, quickly and easily, either by hand troweling or by spraying and even in a considerably moist condition whereby to produce a dependable structure when hardened.

Another object of the invention is to provide a new and improved composite sheet of ribbed expanded metal, often called rib lath, which is backed by a sheet spaced from the expanded metal by a depth determined in part by the depth of the ribs thereby to limit the thickness of plaster which is applied to it.

With these and other objects in view, the invention consists in the construction, arrangement and combination of the various parts of the device, whereby the objects contemplated are attained, as hereinafter set forth, pointed out in the appended claims and illustrated in the accompanying drawings.

In the drawings:

FIGURE 1 is a perspective view of a typical composite sheet of expanded metal and appropriate backing.

FIGURE 2 is a fragmentary plan view of a section of the sheet of FIGURE 1.

FIGURE 3 is a fragmentary cross-sectional view taken on the line 3—3 of FIGURE 1.

FIGURE 4 is a fragmentary cross-sectional view taken on the line 4—4 of FIGURE 2.

FIGURE 5 is a fragmentary longitudinal sectional view taken on the line 5—5 of FIGURE 2.

FIGURE 6 is an elevational view partially diagrammatic of a typical machine capable of performing the method and producing the composite expanded metal product.

FIGURE 7 is a plan view taken on the line 7—7 of FIGURE 6.

FIGURE 8 is a cross-sectional view taken on the line 8—8 of FIGURE 6.

FIGURE 9 is a cross-sectional view taken on the line 9—9 of FIGURE 6.

FIGURE 10 is a cross-sectional view taken on the line 10—10 of FIGURE 6.

FIGURE 11 is a fragmentary longitudinal sectional view taken on the line 11—11 of FIGURE 9.

FIGURE 12 is a fragmentary cross-sectional view taken on the line 12—12 of FIGURE 11.

FIGURE 13 is a fragmentary longitudinal sectional view taken on the line 13—13 of FIGURE 9.

FIGURE 14 is a fragmentary longitudinal sectional view taken on the line 14—14 of FIGURE 10.

FIGURE 15 is a side elevational view of a portion of the mechanism for advancing the expanded metal to the process.

FIGURE 16 is a perspective view of a slightly modified composite sheet partially broken away to show the interior structure.

FIGURE 17 is a cross-sectional view taken on the line 17—17 of FIGURE 16.

FIGURE 18 is a fragmentary plan view of a modified form of the device.

FIGURE 19 is a cross-sectional view taken on the line 19—19 of FIGURE 18.

FIGURE 20 is a fragmentary cross-sectional view taken on the line 20—20 of FIGURE 18.

FIGURE 21 is a fragmentary cross-sectional view taken on the line 21—21 of FIGURE 18.

FIGURE 22 is a side perspective view of an alternate form of the invention used with ribbed metal lath.

In an embodiment of the invention chosen for the purpose of illustration, one form of the product as shown in FIGURES 1 through 5, inclusive, consists of a sheet **10** of expanded metal, often called expanded metal lath, of which the diamond-shaped pattern is exemplary only. Cross-strips **11** which make up the diamond pattern are tilted slightly and give the sheet appreciable thickness as is evident from an examination of FIGURES 3, 4 and 5.

Attached to the sheet **10** of expanded metal is another sheet **13**. Kraft paper or other paper forms for most purposes a very satisfactory sheet, although it is appreciated that the sheet **13** may be virtually any very thin gage, inexpensive, relatively impervious or imperforate material. Examples include other forms of paper and certain types of synthetic plastic sheet material which has sufficient body to hold its shape and sufficient strength to enable attachment to the expanded metal.

An added expedient in some forms of expanded metal, and particularly where made necessary by local building codes under circumstances where no furring strips are used, consists of ridges **14** provided in the expanded metal at spaced intervals which, when applied against some supporting surface, serve to hold the expanded metal out away from the surface by a distance comparable to the height of the ridges.

In order to attach the sheet **13** to the sheet **10**, tongues **15** are punched from the cross-strips **11** of the sheet **10**, the punching serving to tear or puncture the sheet **13** forming apertures **16**. The apertures **16** need not necessarily be defined by a clean-cut hole but may be merely a torn out hole, torn when the tongue **15** is punched out and driven through the sheet. The tongue, moreover, is bent over an edge **17** of the sheet **13**, the tongue being forced into engagement with the edge **17** and pressed physically against adjacent portions **18** of cross-strips **11**. Moreover, paper which initially lay where the aperture **16** ultimately shows is bent over on itself forming a flap **16'** which with the sheet **13** forms a double thickness of paper, thereby to reinforce the fastening effect of the tongue **15**. By locating the tongues all on the ridges **14**, the sheet **13** tends to be held in a position spaced from the sheet **10** forming a space **13'** sufficient to allow a depth of plaster behind the sheet **10**, but without, at the same time, allowing a wasteful depth of plaster to be built up.

Although the tongue **15** may be slightly ragged, as may also be the edge **17**, the very roughness and raggedness will serve to provide a secure fastening means for attaching the sheet **13** at many points **19** over the area of the sheet **10** of expanded metal. In the chosen embodiment the points **19** lie upon the ridges **14**, although it is appreciated that attachments of the same general nature throughout other portions of the sheet **10** may serve satisfactorily.

To provide a quick, inexpensive and effective method of constructing a composite sheet indicated generally by the reference character **20** which, as shown in FIGURES 1 through 5, inclusive, is made up of the two sheets **10** and **13**, a machine may be provided for automatically attaching large sheets together. Although a variety of types of machinery may be employed, one typical of a satisfactory assembling machine is shown in the drawings consisting of a frame indicated generally by the reference character **25** having a bed **26** and supporting legs **27**. At the right end of the bed is a table **28** having rails **29** at the sides for guiding the sheet **10** of expanded metal. The expanded metal may be hand fed, if desired, to the table where it may be picked up by a carrier **30** and advanced into the machine to the process which attaches the sheets together. To operate the carrier, and incidentally other

portions of the machine, there is provided a motor **31** mounted beneath the bed **26** interconnected by a belt **32** with idler pulleys **33** and **34**, the belt being driven by a pulley **35** of the motor. As here shown the carrier comprises a projection **36** supported upon links **37** which make up the belt **32**. As the belt **32** is driven endlessly around the pulleys, the projection projects up through the diamond pattern of the sheet **10** and carries it forward from right to left into the machine to a location where the process starts.

The sheet **13** which may be paper can be stored upon a paper roll **37**, if desired, or at some other convenient location and form such that the sheets can be fed manually or by other means to a paper feed **38** supported in a sloping arrangement by columns **39** at one end and by plates **40** at the other end. Gravity can be depended upon to draw the sheet **13** downwardly into the operation in the absence of a suitable feed means for that purpose. Rollers **41** may be employed for pressing the sheet **13** downwardly as it advances.

As the sheet **10** of expanded metal is fed to the operation, it is picked up by pairs of forming rolls **42** and **43**. The forming rolls **42** comprise a plurality of rolls keyed to and spaced axiallly upon a shaft **44**, the rolls being properly spaced by spacing sleeves **45**. Similarly, the forming rolls **43** are carried by and axially spaced along a shaft **46**, spacing between the rolls **43** being determined by spacing sleeves **47**. The shafts **44** and **46** are driven at the same rates of speed, being interconnected by means of gears **48** and **49**. The drive is accomplished by means of a belt **50** extending from the shaft **46** and a suitable pulley **51** thereon to a pulley **52** on a shaft **53** which also serves to mount the belt **32**.

As shown the forming rolls **42** have annular recesses **54** therein and the forming rolls **43** have a wedge-shaped annular contour which meshes with the recess **54** in each instance. As the forming rolls **42** and **43** roll in counter-rotation to each other in engagement with the sheet **10** of expanded metal, these rolls serve to form the ridges **14** heretofore described as well as to grip the sheet and to advance it through the process, after it becomes disengaged from the projections **36**.

In the product formed by the process and machinery herein described, it is desirable to have the paper about one inch shorter than the expanded metal lath. Therefore, it becomes necessary to provide a means of indexing the paper so that a margin is provided between the edge of the lath and the edge of the paper at each end. The lath itself must also be indexed to make this possible. The index is arranged so that the first punched holes always fall at the same distance from the edge of the expanded metal which enters the operation. Spacing is accomplished by having the belt **32** upon which is mounted the projection **36** geared to the perforating roll so that it always starts the sheet of expanded metal through the machine in proper timing with the punch position on the perforated rolls. Proper indexing provides a one-half inch space at each end between the edge of the expanded metal and the edge of the paper.

Paper feeding accordingly must be indexed to start at the right point with respect to the expanded metal. To accomplish this, when the leading edge of the expanded metal emerging from the forming rolls engages a cam follower roll **55** on a downwardly extending pivoted arm **56**, pivoting about a point **57**, the thickness of the metal is sufficient to raise the cam follower so as to in turn force a roller **58** into engagement with a running idler **59**, thereby providing friction drive to conventional rubber disc drive rolls **41** in engagement with the paper which, prior to this pivotal motion, has been restrained along its feeding edge by upwardly extending stops of conventional character (not shown). The same pivotal motion through a conventional mechanism, likewise not shown, may be employed to retract the stops at the same instant as the rubber drive rolls are advanced. The paper is thus

fed into position upon the expanded metal at the proper moment for correct indexing. As shown, the idler **59** is mounted upon an arm **61** pivoted at a point **62** and normally drawn by a spring **63** into engagement with a cylindrical drive surface **64**.

As the sheet of expanded metal is advanced by the means just described, a sheet **13** of paper or other flexible material is likewise advanced down the paper feed **38** by the paper rollers **41** until the expanded metal and paper meet at a point **65**, as shown to the left of the mid-portion of FIGURE 6. When the sheets of expanded metal are manually fed one sheet at a time, the sheets **13** of flexible material may also be fed one at a time rather than from a roll like the roll **37** under which circumstances some form of cut-off would need to be automatically supplied. A guide **66** serves to impress the sheet **13** downwardly into engagement with the sheet **10** and in particular in engagement with the peaks of the ridges **14**.

The next step which is undertaken by a set **67** of punching rollers serves to punch out the flaps **16'** and the tongues **15**, extending them through the punched out apertures **16** in the sheet **13** to a position where they can be subsequently bent over to the form previously described. The set **67** of punching rollers are located immediately to the left of the point **65**, as shown in FIGURE 6.

The set of punching rollers consists of a lower roller **68** and an upper roller **69**. The relationship of these rollers is shown to good advantage in FIGURES 9, 11, 12 and 13. The roller **68** is carried by a shaft **70** having suitable bearing mounts in brackets **71** and **72**. A belt **73** in engagement with a pulley **74** on the shaft **70** passes over a pulley **75** on the shaft **46** from which power is taken. An idler pulley **76** may be provided mounted upon a bracket **77** beneath the bed **26**. Gears **78** and **79** intermeshing as shown create a counterrotation in the shaft **70** and a shaft **80**, the shaft **80** serving to mount the upper roller **69**.

On the shaft **80** discs **81** and **82** on opposite sides of a spacer **83** create a space **84** for reception of teeth **85** on the shaft **70**. In the chosen embodiment there are four teeth spaced circumferentially at equal distances around the shaft and fastened by means of adjusting screws **86** in a well-known fashion so that the teeth can be adjusted outwardly or inwardly, as may be desired, to produce longer or shorter tongues **15**, there being provided suitable adjusting slots **87** for reception of the screws. A recess **88** in the lower roll **68** accommodates the teeth.

As the sheets **10** and **13** together are passed to the set **67** comprising the rollers **68** and **69** at each of the respective locations extending across the machine, the teeth **85** at longitudinally spaced intervals will punch out the flaps **16'** and tongues **15**. Although, as shown in the drawings, the tongues **15** are punched from that portion of the expanded metal identified as comprising ridges **14**, it will be understood that the tongues, if desired, may be punched from other portions of the expanded metal, even though ridges may also be provided, and particularly for expanded metal where there may be an absence of ridges. The same practice may also follow where, instead of the ridges as shown, raised portions may be substituted in the form of dimples.

When the tongues **15** are punched out of the expanded metal, the tongue in each instance is punched through the sheet **13** making a hole in the sheet as the result of the combined effect of the tongue being driven through the sheet by action of one of the teeth **85** which also is long enough to penetrate the sheet **13**. The flaps **16'** are punched out by the same teeth **85**. When the two sheets leave the set **67** of punch-out rollers, the tongues **15** stick outwardly relative to the sheets and must subsequently be bent over to the positions shown in FIGURES 2, 4 and 5.

When first punched out the tongues extend forwardly and upwardly at an obtuse angle relative to the expanded metal. To bend the tongues backwardly past a 90 degree angle prior to passing through the succeeding bending operation, the tabs engage triangular wedge blocks **89**, as shown in FIGURE 13, the blocks being mounted successively upon a crossbar **89'** at the location shown in FIGURE 6, namely, on the exit side of the perforating roll. The subsequent bending over is accomplished by a set **90** of rollers which are located immediately to the left of the set **67** of rollers as shown in FIGURES 6 and 7. The form and relationship of the rollers of the set **90** are shown in FIGURE 8. Brackets **91** and **92** on opposite sides of the bed **26** support a lower shaft **93** and an upper shaft **94** on suitable conventional bearings **95**. A pulley **96** at one end of the shaft **93** over which is reeved a belt **97** may be driven from the shaft **70** by virtue of having the belt engage a pulley **98** thereon.

In a similar fashion the shaft **94** having a pulley **99** thereon may be driven from the shaft **80** having a pulley **100** thereon through a belt **101**.

On the shaft **93** is a series of axially spaced rollers **102**, the spacing of which conforms with the spacing of the pulleys **68** and teeth **85** and also the spacing of the ridges **14**. Matching the rollers **102** is a set of similarly spaced rollers **103** on the shaft **94**. The circumferences of the rollers **103** are spaced from the circumferences of the rollers **102** forming spaces **104** as indicated on FIGURE 8, the spacing being determined by the thickness of the sheet **10** of expanded metal. As the tongues **15** bent to the new position and accompanied by the sheets **10** and **13** pass beneath the rollers **103** and over the rollers **102**, the rollers roll the tongues **15** to the bent position over the flap **16'** as shown in FIGURES 2, 4 and 5. Although there may be some irregularity in the bending over process due in part to irregularity in the punching-out process in the first instance, the irregularity is in fact beneficial. When the tongues are roughly bent into position the irregularity serves to enhance the grip of the tongue and its ragged edge upon the flap **16'** and the sheet **13** so as to more firmly fasten it in place. During the rolling down or bending over process, the rollers **102** back up the portion of the expanded metal immediately adjacent the punched-out tongue, as the tongue is forced against the sheet **13**, pressing it into engagement with the sheet **10**.

Moreover, due in part to the fact that the sheet **13** is engaged at many points simultaneously throughout its expanse, the sheet is held reasonably taut and under mild tension so that it remains spread out flat. After being attached it is firmly held in engagement with the sheet **10** so that the composite sheet consisting of two sheets attached together in this fashion can be easily handled upon being taken from the machine and stacked and tied for shipment.

On those occasions where there is need for a degree of waterproofing, a compound sheet like that illustrated in FIGURES 16 and 17 is preferred. In this instance there is applied to the sheet **10** of expanded metal a series of strips **110** which may be attached at ridges **14** or spaced as desired across the sheet **10** in those instances where no ridges are provided. In the embodiment of FIGURE 16 the sheet **10** is shown as one without ridges and accordingly the strips lie flush with respect to the surface of the expanded metal. In this instance the strips are fastened by employment of tongues **111** which are punched out and bent over in precisely the same manner as has been described in connection with the tongues **15**. Expanded metal is fed to the machine in the same fashion but instead of a large sheet like the sheet **13** being applied to the paper feed **38**, the strips **110** are supplied instead. The strips are spaced to the extent shown by suitable guiding means and are aligned with the spacing of the rollers of the set **67** and the rollers of the set **90**. In this instance, of course, the forming rollers **42** and **43** are dispensed with.

As the expanded metal having the strips **110** attached

thereto as shown and described passes from the set **90** of rollers, a glue roll **112** located in alignment with each pair of rollers **102**, **103** applies a line of glue to the strip **110**. As a matter of preference the glue roll may be offset laterally slightly with respect to the bent-over tongues **111** so that the glue strip will be continuous and uninterrupted by the punched-out holes. After the glue line has been applied to each of the strips, a waterproof sheet **113** co-extensive with the expanded metal is applied and pressed against the glue lines until the glue has set. No extra pressure is needed inasmuch as the pressure exerted as the composite strips thus formed are stacked one upon the other may be depended upon to exert sufficient pressure so that the gluing attachment will be accomplished throughout the entire area. By applying an imperforate waterproof sheet in this fashion to the strips **110**, the composite sheet thus formed takes advantage of the simple, inexpensive, attaching expedient heretofore described and in addition provides an imperforate sheet, thus making the composite sheet completely imperforate to whatever degree is achieved by the waterproof character of the sheet **113**. The additional expense is little more than the very modest cost of the strips **110** and the time consumed in applying the sheet **113** after the glue lines have been traced.

In a modified form of the device shown in FIGURE 18 through 21, inclusive, the composite sheet of material consists of a sheet **120** of ribbed lath which consists of portions **121**, **122**, **123** and **124** of expanded metal lying between main ribs **125**. Secondary ribs **126** lie substantially midway between each pair of main ribs and subordinate ribs **127** lie between the main ribs and secondary ribs. In most instances side edges like the side edge **128** of the sheet consist of one of the secondary ribs **126**.

The main ribs **125** are imperforate and are relatively deep and somewhat U-shaped in cross-section. The secondary ribs **126** are relatively shallow and frequently dished so that convex sides of the secondary ribs are turned in a direction opposite from convex sides of the main ribs.

A second sheet **130** of relatively thin pliable material such as kraft paper, for example, overlies the main sheet and customarily rests upon the convex sides of the main ribs, as shown in FIGURE 19. Lying in this fashion, the second sheet defines a space **131** between the secondary sheet **130** and the sheet **120** of expanded metal. By determining the depth of the space **131** in the manner described, the amount of plaster which can be sprayed upon the expanded metal sheet **120** is limited in depth by the presence of the second sheet **130**.

To fasten the second sheet **130** to the sheet of expanded metal **120**, tongues **132** of imperforate portions of the main ribs **125** are cut from the main ribs leaving in each instance a hole **133**. The tongues are cut in the manner heretofore described in connection with the first described portion of the disclosure. In each instance the tongue **132** bends around an arc **134** and overlies a flap **135** which is in fact a portion of the second sheet **130** which is torn out during the cutting out of the tongue **132** and laid over on itself producing a double thickness of the material of the second sheet, upon which the tongue **132** lies. The cutting out of the tongue **132** is preferably a jagged cut, leaving rough edges, so that when the tongue **132** is pressed against the flap **135** and the overlain portion of the second sheet **130**, there will be a good grip of the tongue upon the paper, whereby to securely anchor the paper to the rib in each instance.

Good practice suggests that the tongues be spaced at approximately six inch intervals along the main ribs and that the spacing be alternated on adjacent ribs, thereby cutting the longitudinal spacing to one-half the spacing along a single rib.

Inasmuch as the side edge **128** of the sheet ordinarily consists of one of the secondary ribs **126**, it is advisable to cut out a tongue **140** from the appropriate secondary rib **126**, pushing it through an opening **141** in the second sheet **130** and to press the tongue **140** against a flap **142** of material torn from the sheet **130**, thereby to anchor the sheet to the secondary rib in each instance.

In view of the need for low cost in providing expanded metal for spray-on techniques, the simple expedient herein described of applying paper or other material attached directly to the expanded metal, either simply, as in the first form, or as an imperforate waterproof backing in the second form, satisfies the need in the form shown. Only a modest amount of sprayed-on material will be sufficient to adequately coat the expanded metal without prospect of undue accumulation of surplus mortar behind the expanded metal. The material not only is productive of a great saving in avoiding waste as indicated, but also is of considerable help in maintaining a very improved, smooth finish on the surface by reason of the fact that there is no unbalanced accumulation of extra material upon the expanded metal.

In an ultimate form of the invention applied in particular to ribbed metal lath, paper strips **130'** are employed instead of a single overall sheet of paper like the sheet **130** shown in FIGURES 18 and 19, for example. In the form of FIGURE 22 the strips **130'** are made slightly narrower than the distance between the main ribs **125** and are located in position overlying the secondary ribs **126** and subordinate ribs **127**. The aim in this form of the invention is to have the strips **130'** narrower than the distance between main ribs by a distance sufficient to permit the lather to see through the paper-backed metal lath when nailing the lath to appropriate studs thereby to be able to see the studs and properly locate nails when nailing the metal lath fast to the wall.

In the form of the invention of FIGURE 22 tongues **132'** are punched outwardly from the metal lath preferably in the area of the subordinate ribs **127** the tongues preferably being on six-inch centers having either an inline or staggered pattern, the inline pattern being the pattern illustrated in the drawing.

An advantageous method of accomplishing the attachment suggested in FIGURE 22 is to shear the tongues from the metal lath in a punch-out operation making use of a machine comparable to a punchpress. The tongues **132'** in this operation are bent outwardly at right angles to the plane of the metal lath one row at a time. Thereafter paper comprising the strips **130'** is fed down on top of the vertically standing tongues and the tongues forced through paper by appropriate rollers (not shown). After the paper has been positioned in this fashion with tongues punching through to form holes **133'** the tongues are bent down against the paper by operation of another set of rollers. Ragged portions of the tongues **132'** in this form also of the invention are useful in firmly affixing the strips to the metal lath.

While the invention has herein been shown and described in what is conceived to be the most practical and preferred embodiment, it is recognized that departures may be made therefrom within the scope of the invention, which is not to be limited to the details disclosed herein but is to be accorded the full scope of the claims so as to embrace any and all equivalent devices.

Having thus described the invention what is claimed as new in support of Letters Patent is:

1. A composite material adapted to be attached to a support for application thereto of a mortar-like plastic material comprising: a first sheet of expanded metal having a multiplicity of openings therethrough each bounded by a plurality of strands of said expanded metal which are integrally joined at positions spaced about the respective opening, a second sheet of relatively thin, flexible material overlying said first sheet, attachment means securing said second sheet to said first sheet at each of several individual areas of attachment generally uniformly spaced about said sheets, and each said attachment means comprising a tongue of said expanded metal integral with and

extending from said first sheet and through a hole in said second sheet, said tongue comprising multiple irregular free end elements and multiple elongated elements extending in respective different directions whereby to encompass an over-all area relatively greater than the area covered by the elements alone, said tongue overlying a portion of said first sheet and a portion of said second sheet adjacent the respective hole in said second sheet of areas comparable to the over-all area encompassed by said tongue, said portion of said second sheet adjacent the respective hole being contacted by and firmly gripped between said elements of said tongue and said portion of said first sheet adjacent the respective hole.

2. A composite material adapted to be attached to a support for application thereto of a mortar-like plastic material, comprising: a first sheet of expanded metal having a multiplicity of openings therethrough each bounded by a plurality of strands of said expanded metal which are integrally joined at positions spaced about the respective opening, a second sheet of relatively thin, flexible material overlying said first sheet, attachment means securing said second sheet to said first sheet at each of several individual points of attachment generally uniformly spaced about said sheets, and each said attachment means comprising a tongue of said expanded metal integral with and extending from said first sheet and through a hole in said second sheet, said tongue comprising multiple irregular end elements and multiple elongated elements extending in respective different directions initially comprehending an area of said first sheet, said tongue in finished position overlying an area of said first sheet adjacent the area initially comprehended by said tongue and of comparable size and overlying a portion of said second sheet of comparable area adjacent the respective hole in said second sheet, said portion of said second sheet adjacent the respective hole being contacted by and firmly gripped between the elements of said tongue and said portion of said first sheet adjacent the respective hole, said tongue comprising a plurality of said strands of said expanded metal which are integrally joined to one another and extend in different directions.

3. A composite material adapted to be attached to a support for application thereto of a mortar-like plastic material comprising: a first sheet of expanded metal, a second sheet of relatively thin pliable material overlying said first sheet, attachment means securing said second sheet to said first sheet at each of several individual points of attachment generally uniformly spaced about said sheets, each said attachment means comprising a tongue of said expanded metal integral with and extending from said first sheet and through a hole in said second sheet, said second sheet including a flap integrally joined to and extending from an edge of said hole and over a portion of said second sheet adjacent said hole to form with said latter portion a double thickness, said tongue overlying the portions of said first and second sheets adjacent said hole and said flap, said portion of said second sheet adjacent said hole and said flap thereon being contacted by and firmly gripped between said tongue and said portion of said first sheet adjacent said hole thereby to hold said second sheet against said first sheet.

4. A composite lathing material adapted to be attached to a support for application thereto of a mortar-like plastic material, comprising: a sheet of expanded metal, means forming raised portions on said sheet at spaced locations thereon, realtively thin flexible paper strips overlying said sheet in contact with said raised portions thereof, attachment means securing said paper strips to said sheet at each of several individual points of attachment generally uniformly spaced about said strips, each said attachment means comprising a tongue of said expanded metal integral with and extending only from a raised portion of said sheet and through a hole in the adjacent paper strip, the entire free end portion of said tongue overlying the peak of the raised portion of said sheet from which said tongue extends and a portion of the adjacent strip adjacent said hole, said portion of said adjacent strip adjacent said hole being contacted by and firmly gripped between said free end portion of said tongue and the peak of the raised portion of said sheet from which said tongue extends, whereby each said strip is held against its respective adjacent raised portions of said sheet with a gentle yielding pressure, a sheet of moisture resistant material covering said strips and forming a closure over the holes in said paper strips, and means of adhesively bonding said sheet of moisture resistant material to said strips.

5. A composite material adapted to be attached to a support for application thereto of a mortar-like plastic material, comprising: a first sheet of expanded metal including a multiplicity of openings therethrough, a series of imperforate main ribs disposed in spaced parallel relation, and a series of imperforate second ribs generally parallel to and located substantially midway between said main ribs and along two side edges of said first sheet, a second sheet of relatively thin pliable material overlying said first sheet in contact with said main ribs, and attachment means securing said second sheet to certain of said ribs, said attachment means comprising tongues integral with and extending from certain of said ribs and through holes in said second sheet, said second sheet having a flap integrally joined to and extended from an edge of each said hole and overlying a portion of said second sheet adjacent the respective hole, and each said tongue overlying, an anchored engagement therewith, said portion of said second sheet and said flap adjacent the hole through which the respective tongue extends.

6. A composite material adapted to be attached to a support for application thereto of a mortar-like plastic material comprising: a first sheet of expanded metal including a multiplicity of openings therethrough, a series of main ribs disposed in spaced parallel relation and comprising imperforate relatively deep and substantially U-shaped projections with convex sides extending in one transverse direction of said sheet, a series of secondary ribs comprising imperforate relatively shallow projections with convex sides extending in the opposite transverse direction of said sheet and located substantially midway between said main ribs and along two side edges of said sheet, a second sheet of relatively thin pliable material overlying said first sheet in contact with said main ribs, and attachment means securing said second sheet to said first sheet, said attachment means comprising tongues integral with and extending from said main ribs and through holes in said second sheet, said second sheet having a flap extending from and integrally joined to an edge of each of said holes and overlying a portion of said second sheet adjacent the respective hole, and each said tongue overlying, in anchored engagement therewith, said portion of said second sheet and said flap adjacent the hole through which the respective tongue extends.

7. A composite sheet material according to claim 17 wherein: said attachment means further comprises additional tongues integral with and extending from said secondary ribs along said side edges of said first sheet, said additional tongues extending through additional holes in said second sheet, said second sheet having a flap extending from and integrally joined to an edge of each said additional hole and overlying a portion of said second sheet adjacent the respective additional hole, and each said additional tongue overlying, in anchored engagement therewith, said portion of said second sheet and said flap adjacent the additional hole through which the respective additional tongue extends.

8. A composite material adapated to be attached to a support for application thereto of a mortar-like plastic material comprising: a first sheet of expanded metal, means forming raised portions on said first sheet at spaced locations thereon, a second sheet of relatively thin flexible

paper overlying said first sheet in contact with said raised portions thereof, attachment means securing said second sheet to said first sheet at each of several individual points of attachment generally uniformly spaced about said sheets, and each said attachment means comprising a tongue of said expanded metal integral with and extending only from a raised portion of said first sheet and through a hole in said second sheet, said tongue comprising multiple irregular end elements and multiple elongated elements in respective different directions comprehending an over-all area relatively greater than the area covered by the expanded metal elements alone, the entire free end portion of said tongue overlying the peak of the raised portion of said first sheet from which said tongue extends and a portion of said second sheet adjacent said hole, said portion of said second sheet adjacent said hole being contacted by and gripped between said elements of said tongue and said peak of the raised portion of said first sheet from which said tongue extends, whereby said second sheet contacts only said raised portions of said first sheet and is spaced from said first sheet in the regions between said spaced portions, and said second sheet is held

against said raised portions of said first sheet with a gentle yielding pressure and held clear of portions of said first sheet intermediate said raised portions.

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