S. M. FORD.

MACHINE FOR MAKING LATH BOARD.

APPLICATION FILED MAY 8, 1916.

1,245,450.

Patented Nov. 6, 1917.

4 SHEETS—SHEET 1.

Fig. 1

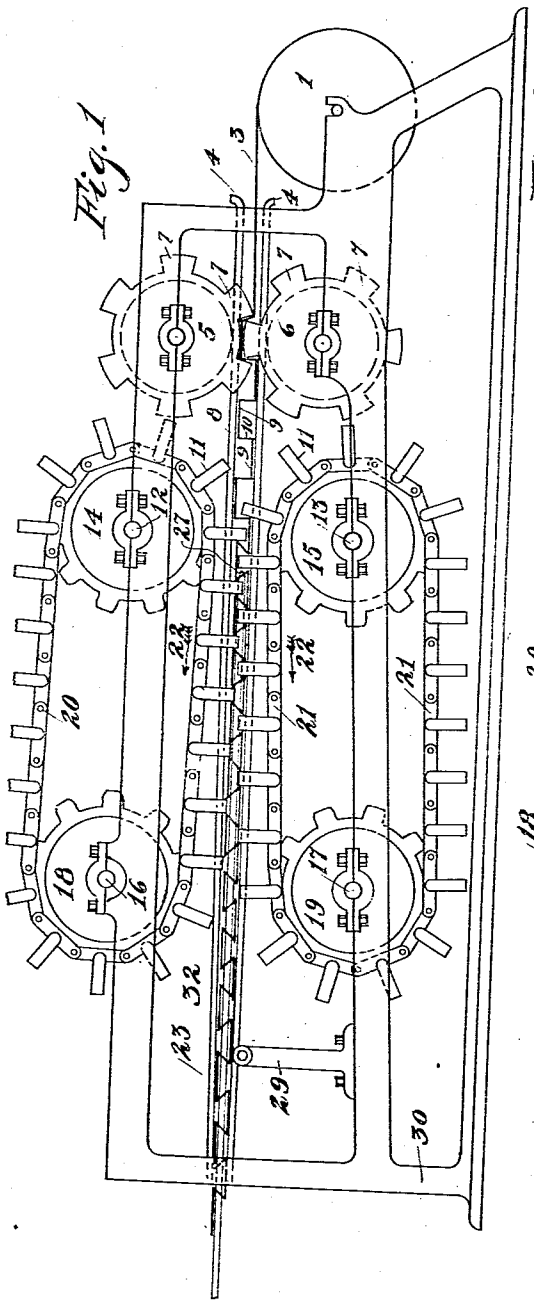
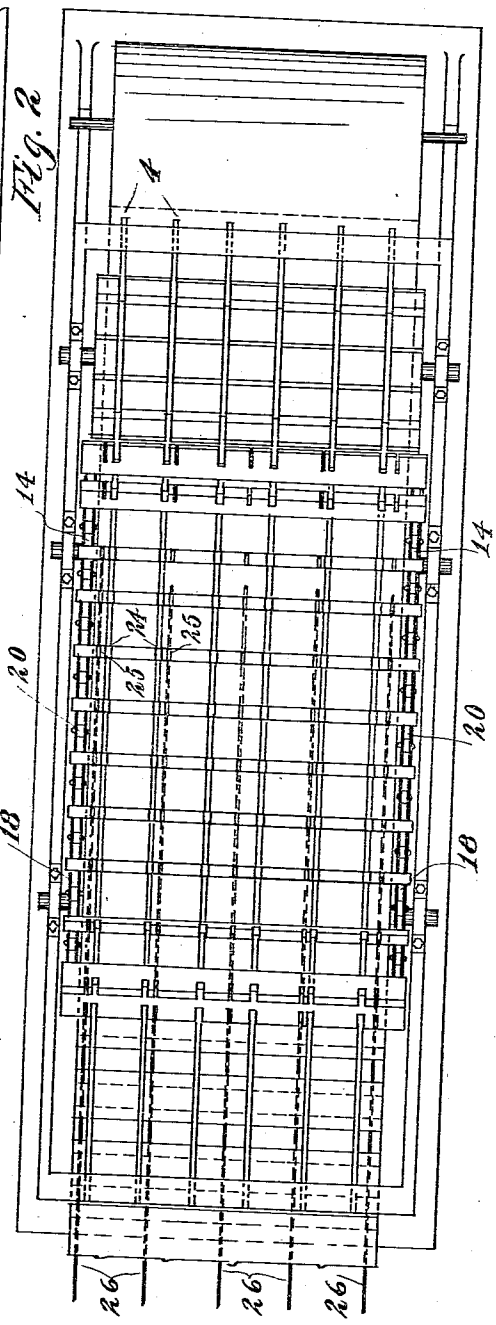


Fig. 2



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4 SHEETS—SHEET 2.

Fig. 6

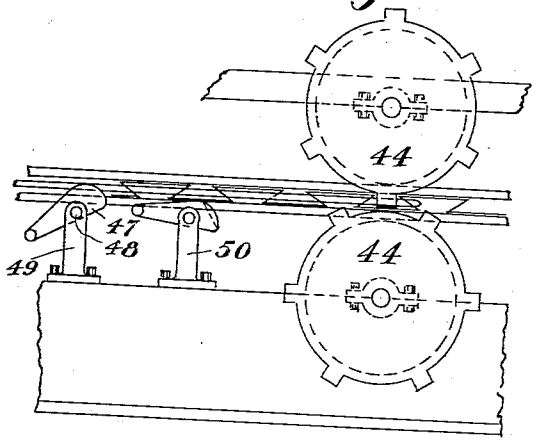



Fig. 5

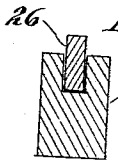
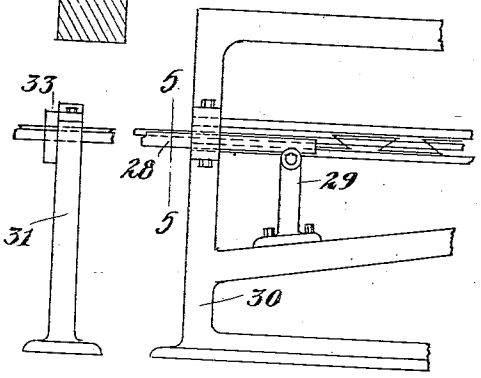



Fig. 3



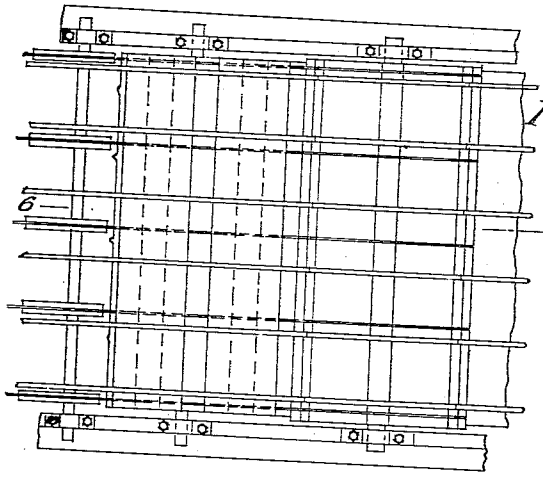




Fig. 7

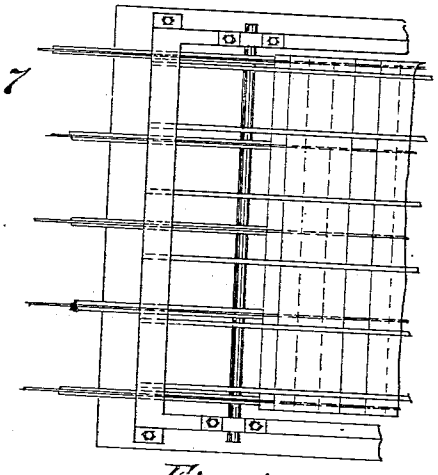


Fig. 4

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4 SHEETS—SHEET 3.

Fig. 8

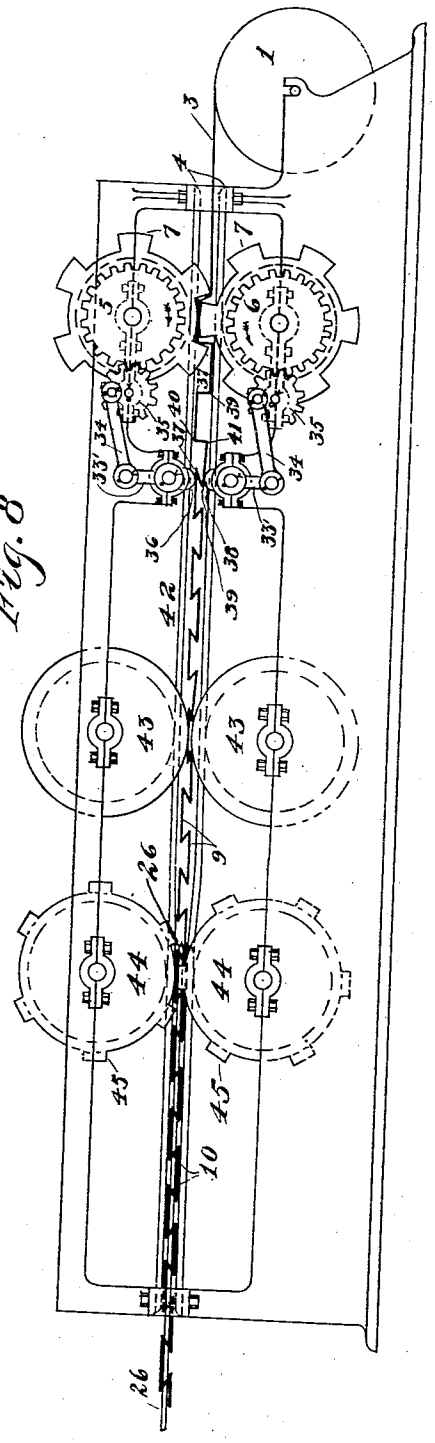
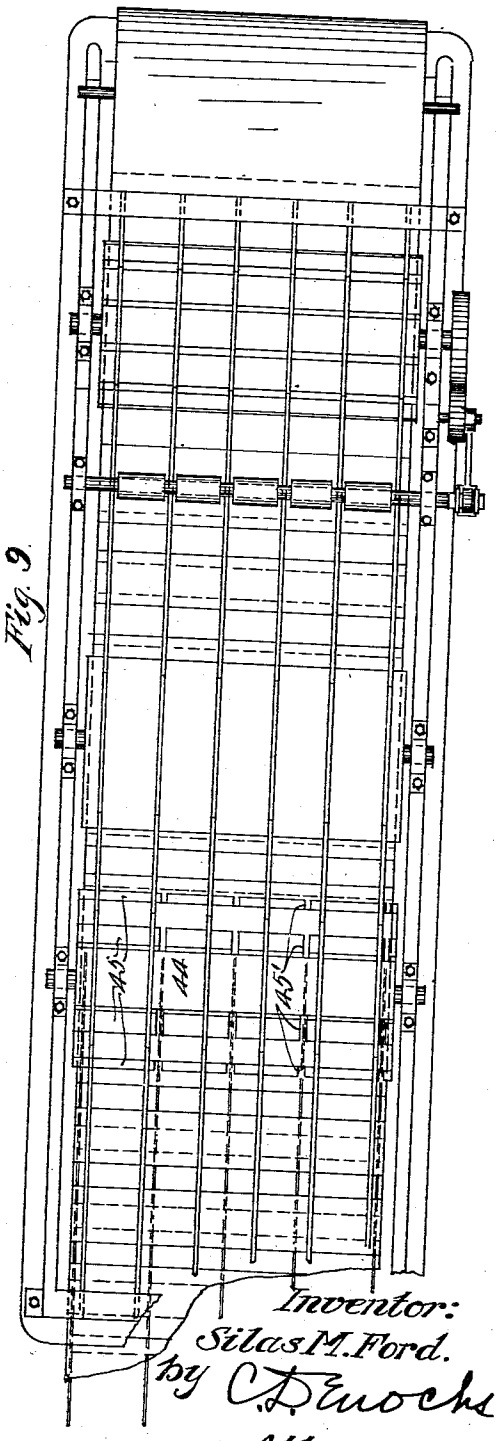



Fig. 9




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4 SHEETS—SHEET 4.

*Fig. 10*

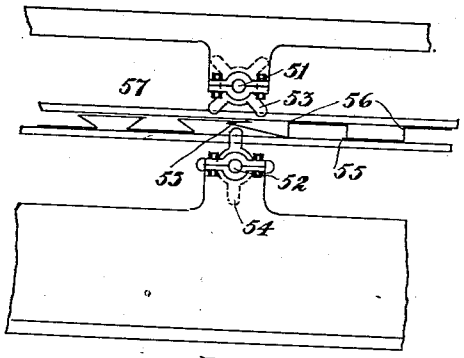



*Fig. 12*

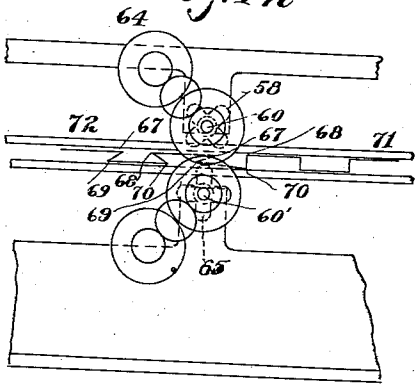



*Fig. 11*

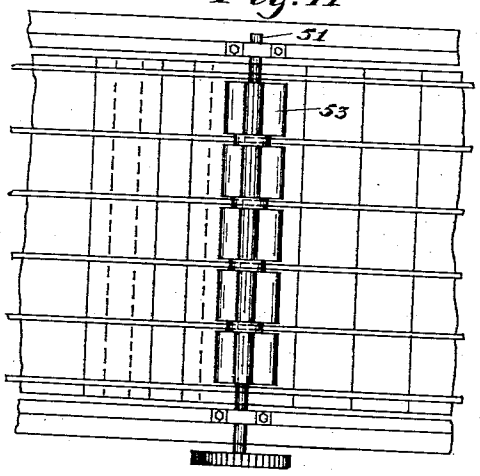
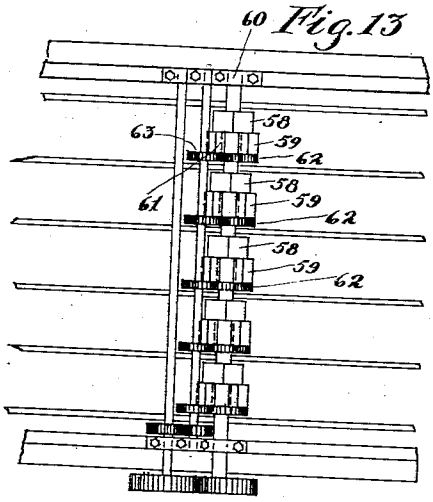



*Fig. 13*




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*Silas M. Ford.*
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# UNITED STATES PATENT OFFICE.

SILAS M. FORD, OF ST. PAUL, MINNESOTA.

## MACHINE FOR MAKING LATH-BOARD.

1,245,450. Specification of Letters Patent. Patented Nov. 6, 1917.

Application filed May 8, 1916. Serial No. 96,259.

*To all whom it may concern:*

Be it known that I, SILAS M. FORD, a citizen of the United States, and a resident of St. Paul, in the county of Ramsey and State of Minnesota, have invented certain new and useful Improvements in Machines for Making Lath-Board, of which the following is a specification.

This invention relates particularly to a machine for making lath-board wherein the lath-board, preferably of water-proofed fibrous material, is crimped into a corrugated or dove-tailed shape, and means are also provided for running a stiffening wire through the crimped stock.

One object of my invention is to provide means for crimping the material to be made into lath-board into a corrugated or dove-tailed shape, and provide therewith means for stripping the material so formed from the forming means as soon as the form has been established.

Another object of my invention is to make the stripping means of such a design that they will hold the material into the form in which it is pressed, and tend to bring it from a corrugated shape to a dove-tailed shape.

Another object of my invention is to provide means for gathering the material crimped into a corrugated shape into a dove-tailed shape.

Another object of my invention is to provide means for setting the corrugations formed into a dove-tailed shape after they have come from the corrugating rolls.

Another object of my invention is to provide a guide for the reinforcing wires in such manner that the formed stock may be fed on to the wires, without liabiltiy of the wires buckling.

With these and incidental objects in view the invention consists of certain novel features of construction and combination of parts, the essential elements of which are hereinafter described with reference to the drawings which accompany and form a part of this specification.

In the drawings Figure 1 discloses a side elevation partly in section of the preferred form of my improved machine with the means for guiding the reinforcing wires omitted.

Fig. 2 is a plan view of the same. Fig. 3 is a side elevation of a portion of the rear end of my machine showing my preferred manner of guiding the reinforcing wire, and Fig. 4 is a plan elevation of the same.

Fig. 5 is a section taken on the line 5—5, Fig. 3. Fig. 6 is a section taken on the line 6—6, Fig. 7, showing an alternate construction of the portion of the machine shown in Fig. 3, and Fig. 7 is a plan view of the same.

Fig. 8 is a side elevation of an alternate construction of my improved machine with the means for guiding the reinforcing wires omitted, and Fig. 9 is a plan view of the same.

Fig. 10 is a side elevation of an alternate construction of the rocker bars shown in Figs. 8 and 9, and Fig. 11 is a plan view of the same.

Fig. 12 is a still further modification of the rocker bars shown in Figs. 8 and 9, and Fig. 13 is a plan view of the same.

The water-proofed paper or whatever material is to be used in making the lath-board is taken from the roll 1, Fig. 1, in which it is ordinarily shipped.

The paper 3 passes through the guides 4 of the crimping rolls 5 and 6, which are geared together and driven by any suitable means, and cleats 7 crimp the paper into a corrugated shape, as shown at 8, with spaced faces 9 and webs 10 connecting the faces 9.

I employ preferably six pairs of guides 4, as better shown in Fig. 2, and these guides pass through slots in the cleats 7 and grooves in the rolls 5 and 6 and also through slots in the slats 11, and support and guide the formed paper through the entire forming process.

As the distance between the upper and lower sets of guides is just sufficient to pass therein between the corrugated lath-board, the material is stripped from the rolls 5 and 6 as soon as formed.

The material now in a corrugated shape, as shown at 8, Fig. 1, passes toward the gathering mechanism.

This gathering mechanism comprises a pair of shafts 12 and 13, each of which carries sprocket wheels 14 and 15 at either end of the shafts.

A similar pair of shafts 16 and 17 also carry a pair of sprocket wheels 18 and 19 at either end of each shaft.

A pair of chains 20 carried by the upper set of sprocket wheels, and a similar pair of chains 21, carried by the lower set of sprocket wheels, carry the slats 11, which are integral with, or rigidly attached to links of the sprocket chain.

The gathering mechanism is preferably geared to the rolls 5 and 6, so that the peripheral speed of the slats 11 as they travel around the sprocket wheels 14 and 15, is the same as the peripheral speed of the rolls 5 and 6 carrying the paper, hence the slats will register with the corrugations of the paper, as shown at 8.

It is evident that as the sprocket wheels turn in the direction of the arrows 22, when the slats 11 leave the sprocket wheels 14 and 15 and travel in a straight line on the chain, their speed is retarded to that of the speed of the sprocket wheels 14 and 15 at their pitch diameter.

It is evident, therefore, that as the slats 11 on the chains 20 and 21 register with the corrugations as at 8, and then slow up their speed, the paper must be pressed together and the result is the dove-tailed form, as shown at 23, the guides 4 preventing any buckling of the paper.

It is evident that as the slats 11 closely fit the spaces between the faces 9 of the dove-tailed board, it would be impossible to have these slats roll out of the spaces, as they rolled into the spaces while the material was still corrugated, hence the distance between the centers of the shafts 16 and 17 is increased over the distance of the centers of the shafts 12 and 13, so that when any individual slat has reached the center line of shafts 16 and 17, it has been withdrawn entirely from the spaces between the faces 9 of the dove-tailed lath-board. This could of course be accomplished by using smaller sprockets on the shafts 16 and 17 with the centers in line, but I prefer the construction as shown.

The slats 11 have not only the slots 24, Fig. 2, cut therein, through which the guide wires pass, but also a series of slots 25 for the reinforcing wires 26. The reinforcing wires which are held and guided in a manner to be described hereafter have their forward ends pointed, as shown at 27, Fig. 1, so that the slats 11 carrying the dove-tailed board will force the webs 10 on to the reinforcing wires 26, and carry the paper backwardly in the direction of the arrows 22 threaded on to the reinforcing wires 26.

Guides 28, Figs. 3 and 5, are provided in which the reinforcing wires 26 rest during the threading operation.

A series of rollers 29, suitably mounted on the frame 30 of the forming machine itself, and also on standards 30 beyond the wire threading end of machine, as shown in Fig. 3, serve to carry the guides 28 and allow them to be pushed rearwardly by the dove-tail shaped lath-board, as the wires are threaded therein.

In starting the operation, the wires would be placed with their pointed ends at the point 27, and the forward end of the guides 28 would be positioned at the point 32, Fig. 1.

The wires themselves are held by suitable clamps 33, Fig. 3, and the guides 28 would be forced backwardly from under the reinforcing wires, leaving them reinforced by the webs 10 of the paper over that portion of the wires threaded through the lath-board.

As an alternate construction, I take the paper 3, Fig. 8, pass it through rolls 5 and 6, with cleats 7 as already described, and have similar guides 4 carrying the material entirely through the machine, as shown in Figs. 8 and 9.

Instead of the gathering means, as shown in Figs. 1 and 2, I utilize a pair of rocker bars 33', Fig. 8, driven by connecting rods 34 from the pinions 35, which in turn are driven by gears carried by the rolls 5 and 6.

The resultant oscillatory motion is timed through the gearing, so that when the face 36 travels in an anti-clockwise direction, it will strike points 37 of the corrugated paper and press it downwardly, while the face 38, also traveling in an anti-clockwise direction, will strike points 39 of the corrugated paper and force these portions of the paper upwardly.

On the return stroke of the oscillatory motion, the surface 36 will strike points 40, while traveling in a clockwise direction, and the face 38 will strike points 41, also while traveling in a clockwise direction, so that by the action of the rocker arms, the corrugated shape is forced into the dove-tailed shape, shown at 42.

I prefer to use with this method a pair of squeeze rolls 43, although they are not absolutely essential.

With this construction I utilize a pair of threading rollers 44 having slats 45 thereon, so spaced, and the rolls so geared that these slats will register with the spaces between the surfaces 9 of the dove-tailed paper. These slats have slots to receive and support the reinforcing wires 26 and they are threaded through the webs 10 of the corrugated lath-board at this point in the same manner as they are threaded through the dove-tailed lath-board at the point 27 in the machine, shown in Figs. 1 and 2.

The method of reinforcing and supporting the wires 26 may be the same as already described, or I may employ in place of the guides 28 a series of pivoted and slotted guides 47, Figs. 6 and 7.

These guides 47 are pivoted at 48, so that they are normally in the position of the ones

shown on the standard 50, Fig. 6, but when the corrugated paper passes over them the forward end is cammed by the paper itself, and they assume the position of the ones shown on the standard 49, Fig. 6.

With the construction shown in Figs. 6, 7, 8 and 9, the guide wires would pass through the rolls and slats used in the forming of the dove-tailed lath-board, and the threading means in the same manner as already described with respect to the machine shown in Figs. 1 and 2.

A simpler form of rocker bars 33′, Figs. 8 and 9, is shown in Figs. 10 and 11, in which the shafts 51 and 52 carry slats 53 and 54, respectively, driven by rolls 5 and 6, Figs. 8 and 9, at such speed that the slats 54 will strike points 55 of the corrugated paper, and slats 53 will strike points 56 of the corrugated paper, thereby forcing the corrugated shape into a dove-tailed shape, as shown at 57.

A further modification for attaining the same end is shown in Figs. 12 and 13, in which the rocker bars 33′, Figs. 8 and 9, are replaced by slats 58 and 59, and 65 and 66, Figs. 12 and 13.

A shaft 60, Fig. 12, has keyed thereto a series of sleeves, each carrying the sectional slats 58. Journaled on the shaft 60, a series of sleeves 61 carry slats 59, and these sleeves are driven by gears 62 integral with the sleeves 61, by pinions 63, driven in turn by the chain of gears 64.

The lower shaft 60′ also carries a similar set of keyed and journaled sleeves, which carry slats 65 and 66, similar to slats 58 and 59, respectively.

It is evident that with the series of slats 58 and 65 driven in an anti-clockwise direction, while the series of slats 59 and 66 are driven in a clockwise direction, and the gearing of the shafts 60 and 60′, and the rolls 5 and 6 of the proper ratio, the slats 58 will strike points 67, slats 59 traveling in a clockwise direction will strike points 68, while slats 65 traveling in an anti-clockwise direction will strike points 69, and slats 66 traveling in a clockwise direction will strike points 70 of the corrugated paper, thus forming it from a corrugated shape, shown at 71, to the dove-tailed shape, shown at 72.

With any of the methods as shown, the guides 4 run entirely through the forming and threading portion of the machine, and I prefer to have the guides narrowed at the points in the forming machine where the forming of the lath-board is changed from a corrugated to a dove-tailed shape, so that while the lath-board fits the guides closely in its corrugated shape, it will also fit the narrowed guides closely in its dove-tailed shape.

In fact, I am able by using a sufficient number of guides, so as to create a considerable amount of friction, to form the lath-board from a corrugated shape to a dove-tailed shape merely by narrowing the guides, but this method requires a great deal more power, and is less satisfactory than my preferred construction, although it is covered in the scope of this invention.

While I have described my invention and illustrated it in one particular design, I do not wish it understood that I limit myself to this construction, as it is evident that the application of my invention may be varied in many ways within the scope of the following claims.

Claims:

1. In a machine for making lath-board of paper or other suitable material, the combination of means for forming said material into substantially rectangular corrugations, a pair of shafts having sprocket wheels thereon associated with said forming means, a sprocket chain, a series of slats carried by said sprocket chain, the width of said slats extending radially from said sprocket wheels as they pass thereover, and extending at right angles to said sprocket chains as they pass between said sprocket wheels, the outer edges of said slats as they pass over said sprocket wheels, being spaced uniformly with the corrugations of said material as it comes from said forming means and the distance between said slats when carried by said chains between said sprocket wheels, being the distance between the dove tailed plaits of the completed lath-board.

2. In a machine for making lath-board of paper or other suitable material, the combination of means for forming said material into substantially rectangular corrugations, a guide for said material whereby it will be carried from said machine with the plane of said lath-board maintained in substantially the same relation to the machine, gathering means comprising a pair of sprocket wheels, a sprocket chain associated with said sprocket wheels, gathering slats on said sprocket chain for gathering said corrugations more closely together, said slats being positioned closer to the plane of said lath-board at the first of said sprocket wheels than at the second.

3. In a machine for forming lath-board of paper, or other suitable material, the combination of forming means whereby said material will be formed into a corrugated shape, gathering means for gathering said corrugations so formed into a dove-tailed formation, comprising a pair of sprocket wheels, a sprocket chain carried by said sprocket wheels, forming slats carried by said sprocket chain, means for leading said paper in its corrugated shape to the first of said sprocket wheels and carrying it with said sprocket chain to and beyond said second sprocket wheel, and the second sprocket

wheels being positioned higher from said corrugated paper than the first of said sprocket wheels.

4. The combination with a guide for conveying material, of a pair of sprocket wheels, a sprocket chain associated with said sprocket wheels, gathering slats for gathering material into more intimate relation associated with said sprocket chain, said sprocket chain and said sprocket wheels being positioned so that said chain is closer to said guide where said material is introduced to said gathering slats than where said material leaves said gathering slats.

5. In a machine for making lath board, the combination of a pair of corrugating rolls whereby material may be formed into a corrugated shape, means for forming said material from said corrugated shape to a dove-tailed shape, a corrugated roll having slots in the corrugations thereof adapted to co-act with said dove-tailed shaped board, and means for holding a reinforcing wire guided by the slots in said corrugated roll so that one end thereof may be forced through the webs of the dove-tailed shaped board.

6. In a machine for making lath board, the combination of means for forming material into a corrugated or dove-tailed shape, means for threading reinforcing wire through the webs of said corrugated or dove-tailed shape and a reinforcing guide for said wire, slidably mounted, and adapted to be pushed ahead of said material as it is fed unto said wires.

7. In a machine for making lath board, the combination of means for forming paper or other suitable material in substantially rectangular corrugations, and traveling slats associated therewith for gathering said rectangular corrugations into more intimate relation with each other.

8. In a machine for making lath-board, the combination of means for forming paper or other suitable material into substantially rectangular corrugations, stripper guides associated therewith adapted to strip said material from said forming means and guide it through said machine and transverse traveling slats associated therewith for gathering the faces of said rectangular corrugations more closely together after they have left said forming means.

9. In a machine for making lath-board, the combination of forming means adapted to form said material into substantially rectangular corrugations, stripper guides associated therewith and adapted to strip said material from said forming means and guide it through said machine, transverse traveling slats associated with said stripper guides whereby said rectangular corrugations may be gathered more closely together, thereby changing them into dove tailed plaits, said stripper guides being narrowed at the point where said material is gathered into the dove-tailed form by said gathering means.

10. In a machine for making lath-board of paper or other suitable material, the combination of means for forming said material into substantially rectangular corrugations, gathering means whereby said rectangular corrugations are brought more closely together, thus forming dove-tailed plaits, guides associated with said gathering means whereby reinforcing wires may be introduced to said plaited formations and the lath board threaded onto the reinforcing wires.

11. In a machine for making lath board of paper or other suitable material, the combination of means whereby said material may be formed into substantially rectangular corrugations, a pair of shafts having sprocket wheels thereon associated with said forming means, a series of slats carried by said sprocket chains, the width of said slats extending radially from said sprocket wheels as they pass thereover and extending at right angles to said sprocket chains as they pass between said sprocket wheels, the outer edges of said slats being spaced substantially uniformly with the corrugations of said material as it comes from said forming means, as said slats pass over said sprocket wheels and spaced substantially the distance between the dove-tailed plaits of the completed lath board when carried by said chains between said sprocket wheels.

12. Mechanism for gathering corrugated shaped boards into dove-tailed shaped boards comprising in combination, with means whereby material may be formed into substantially rectangular corrugations, of a pair of shafts having sprocket wheels thereon, sprocket chains associated with said sprocket wheels, a series of slats carried by said sprocket chains, the width of said slats extending radially from said sprocket wheels as they pass thereover, and at right angles to said sprocket chains as they pass between said sprocket wheels, the outer edges of said slats being spaced uniformly with the corrugations of said material as it comes from said forming means while said slats pass over said sprocket wheels and being spaced uniformly with the dove-tailed plaits of the completed lath board while said slats pass between said sprocket wheels.

13. In a machine for making lath board of paper or other suitable material, the combination of means for forming said material into substantially rectangular corrugations, gathering means timed with said forming means and adapted to register with the depressions between corrugations, and means for slowing up the speed of said gathering means after said gathering means registers with the depressions in said corrugated boards.

14. In a machine for making lath-board of paper or other suitable material, the combination of means for forming said material into substantially rectangular corrugations, a guide for said material whereby it will be carried from said machine with the center plane of said lath board maintained in substantially the same relation to said machine, gathering means comprising a pair of sprocket wheels, a sprocket chain associated with said sprocket wheels, gathering slats on said sprocket chain, said slats being positioned closer to the center plane of said lath board near one of said sprocket wheels than near the other of said sprocket wheels.

15. In a machine for forming lath-board of paper or other suitable material, the combination of forming means whereby said material will be formed into corrugated lath-board, gathering means for gathering the corrugations of said material into dove-tailed plaits comprising, a pair of sprocket wheels, one of said sprocket wheels being positioned higher than the other of said sprocket wheels, a sprocket chain associated with said sprocket wheels and forming slats associated with said sprocket chain and adapted to travel with the faces of said corrugations and said dove-tailed plaits.

16. The combination with a guide for conveying material, of a pair of sprocket wheels, a sprocket chain associated therewith, forming slats associated with said sprocket chain, said sprocket chain being so positioned that said chain is closer to said guide, at its forward end than at its rearward end.

17. In a machine for making lath-board, the combination of a pair of corrugating rolls, means whereby material formed into a corrugated shape by said rolls may be formed into dove-tailed shape, a shaft having slats whose width extends radially therefrom, said slats registering with said dove-tailed material as it is fed from said dove-tailed forming means, a slot in each of said slots whereby a reinforcing wire may be introduced and said paper forced onto said reinforcing wire.

18. In a machine for making lath-board, the combination of a pair of corrugating rolls, means whereby material formed into a corrugated shape by said rolls may be formed into a dove-tailed shape, a shaft having slats whose width extends radially therefrom, said slats registering with said dove-tailed material as it is fed from said dove tailed forming means, a slot in each of said slats whereby a reinforcing wire may be introduced and said paper forced onto said reinforcing wire, and a reinforcing guide for said reinforcing wire to prevent buckling thereof.

19. In a machine for making lath-board, the combination of a pair of corrugating rolls, means whereby material formed into a corrugated shape by said rolls may be formed into dove-tailed shape, a shaft having slats whose width extends radially therefrom, said slats registering with said dove-tailed material as it is fed from said dove-tailed forming means, a slot in each of said slats whereby a reinforcing wire may be introduced and said paper forced onto said reinforcing wire, and a reinforcing guide for said reinforcing wire to prevent buckling thereof, said reinforcing guide being slidably mounted and adapted to be pushed ahead of the material as the material is threaded onto said wire.

20. In a machine for making lath-board, the combination of means for forming material into a series of dove-tailed plaits and means for threading a reinforcing wire through the webs intermediate of the faces of said dove-tailed plaits.

21. In a machine for making lath-board, the combination of a pair of corrugating rolls, means associated therewith for gathering material into a series of dove-tailed plaits, means for holding a reinforcing wire as the formed material is threaded thereon and a reinforcing guide for said wire adjacent to the point where said wire is introduced to said material.

22. In a machine for making lath-board, the combination of means for forming material into a corrugated or dove-tailed shape having webs intermediate of the faces of the formed material, and means for threading a reinforcing wire through said webs.

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