United States Patent

[11] 3,595,115

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[21] Appl. No. **820,598**
[22] Filed **Apr. 30, 1969**
[45] Patented **July 27, 1971**
[73] Assignee **Dimco**

[54] **PORTABLE LATH SLITTING MACHINES**
13 Claims, 16 Drawing Figs.

[52] **U.S. Cl.** ..... **83/165,** 83/470, 83/471, 83/500, 83/701, 143/43 A, 280/43.1

[51] **Int. Cl.** **B26d 7/06,** B23d 19/04

[50] **Field of Search** 83/648, 165, 470, 471, 472, 500, 501, 502, 503; 280/46, 38, 35, 36, 43.1, 43.17, 43.22, 43.24, 47.24; 269/55, 309; 143/43, 132; 144/286

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Primary Examiner—Frank T. Yost
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ABSTRACT: A readily portable metal lath slitting machine having a retractable carriage crosswise of its heavier end equipped with lever means for convenience and ease of shifting the carriage between extended and retracted positions. The machine slits one or several layers of lath simultaneously with ease. Extendable work-supporting tables provide ample space for accommodating large sheets of stock material and fold compactly against the machine into a size permitting the machine to be rolled by one man through normal-size doors and into a conventional passenger elevator.

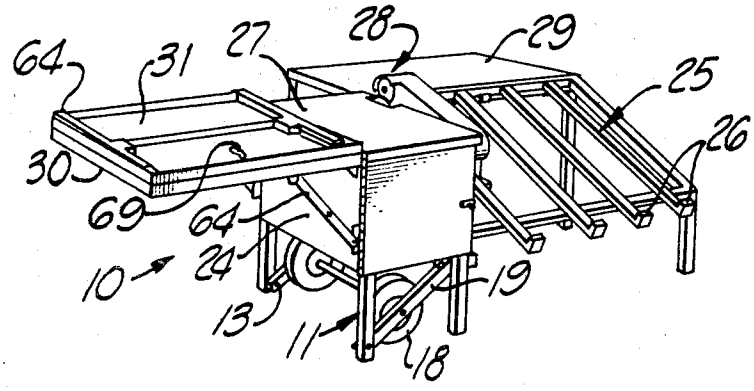
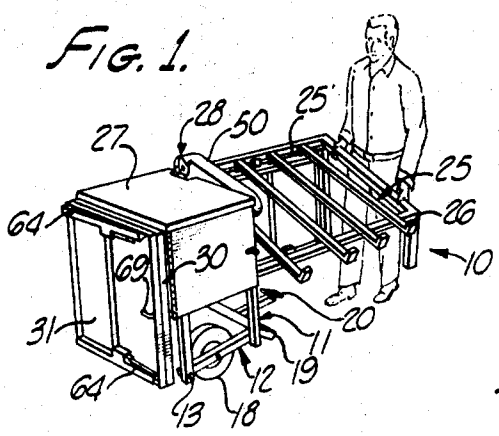


FIG. 1.



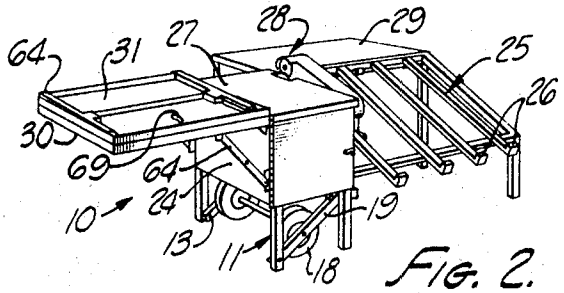
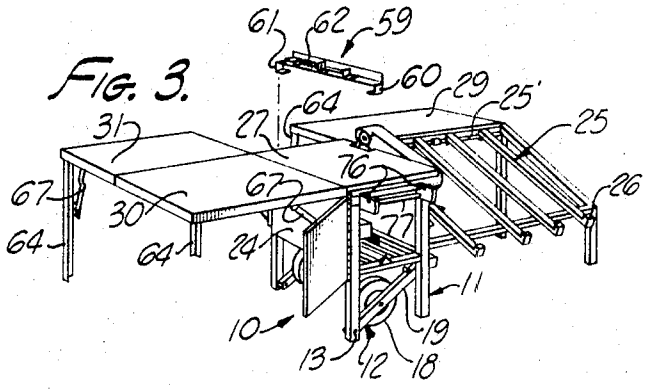


FIG. 2.

FIG. 3.



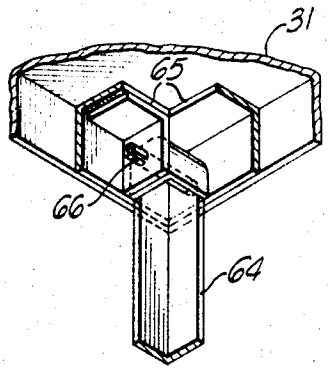


FIG. 12.

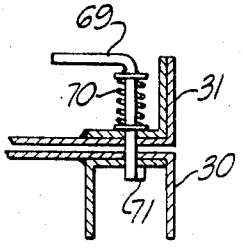


FIG. 13.

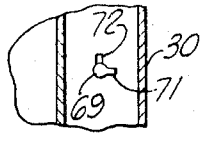


FIG. 14.

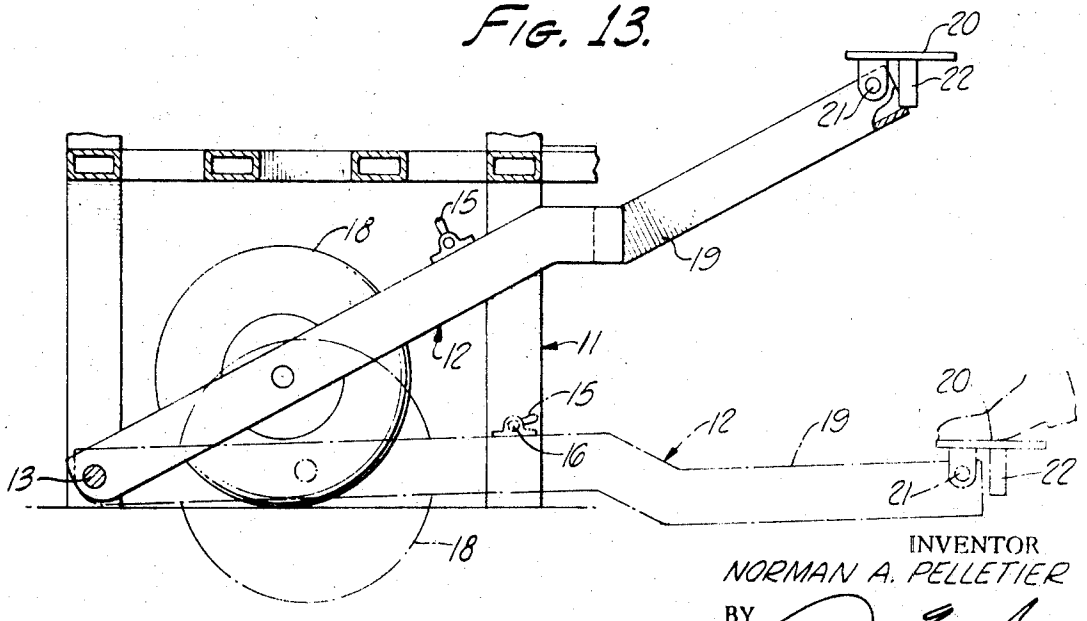
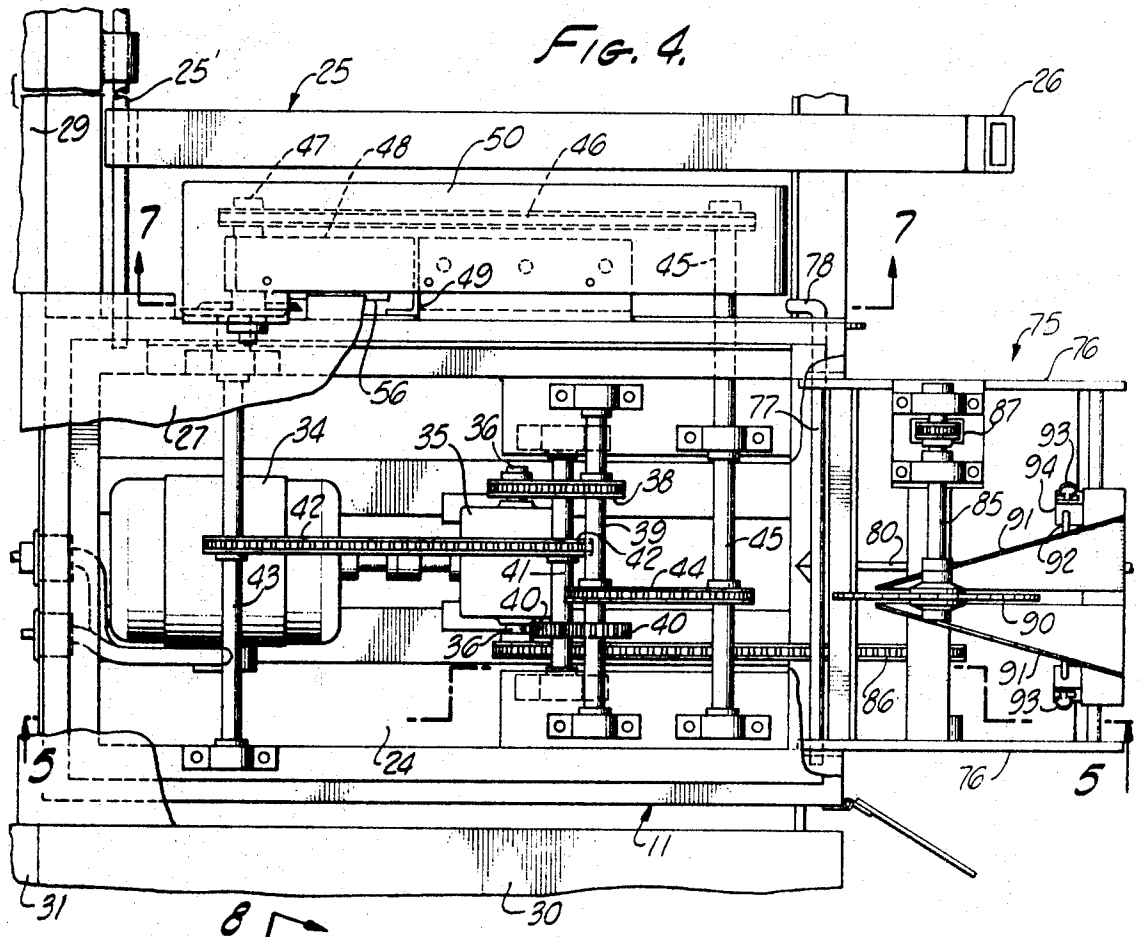


FIG. 11.

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FIG. 4.



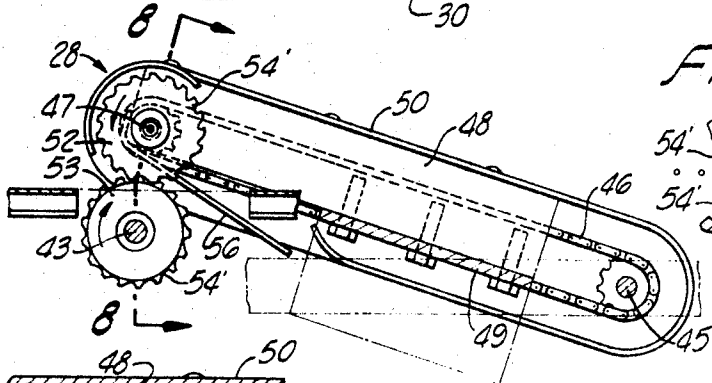
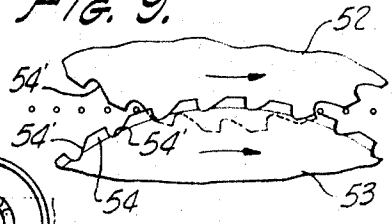


FIG. 7.

FIG. 9.



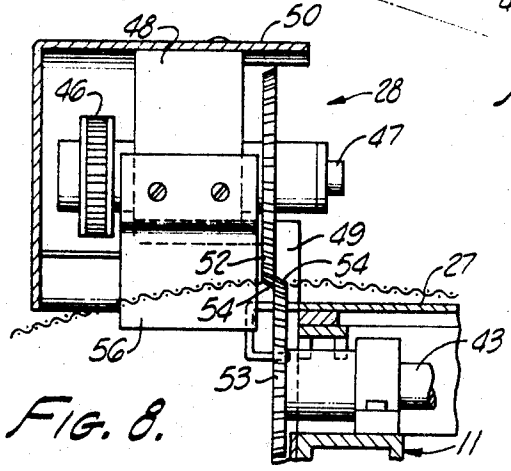


FIG. 8.

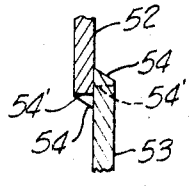


FIG. 10.

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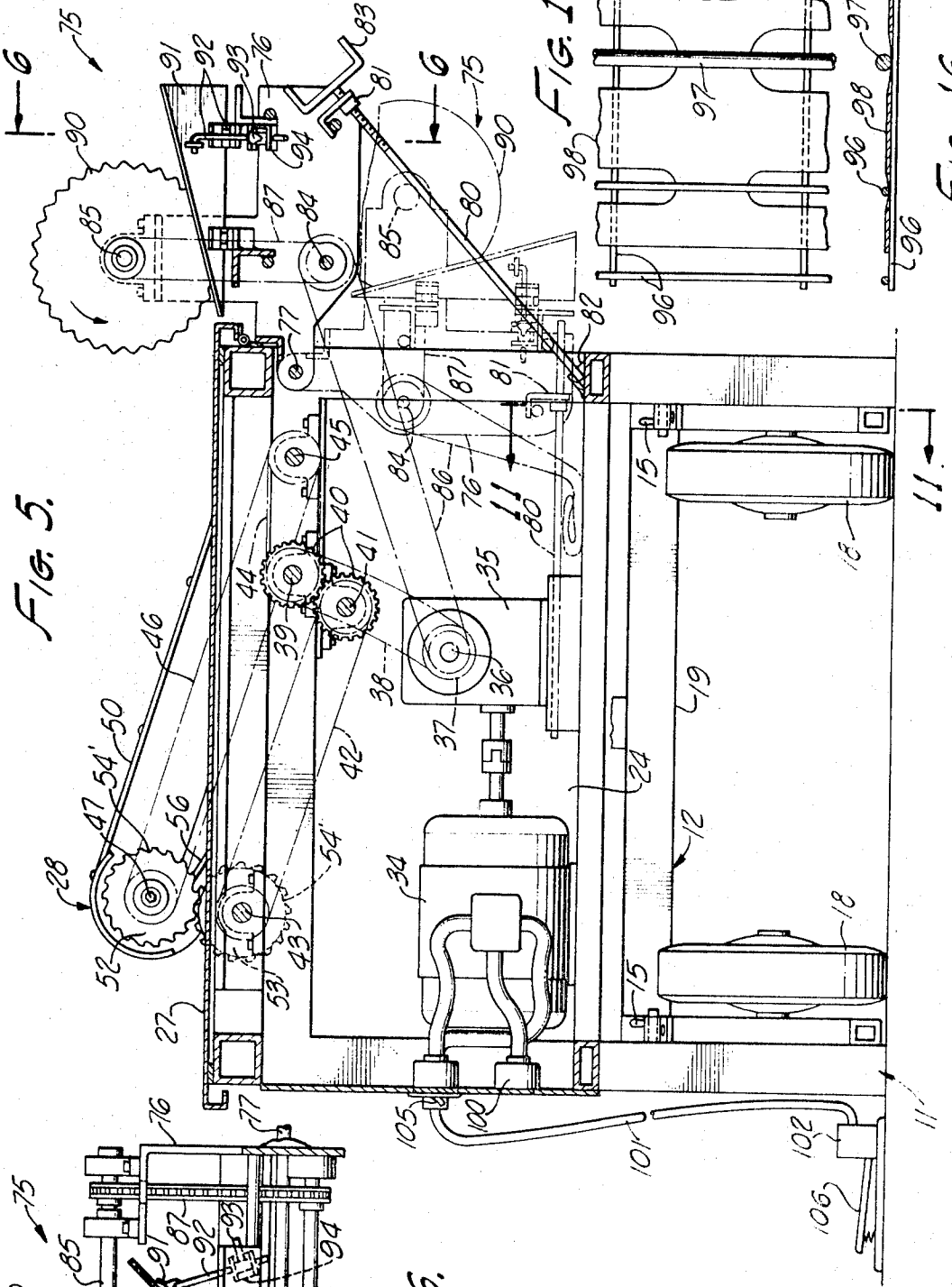


FIG. 5.

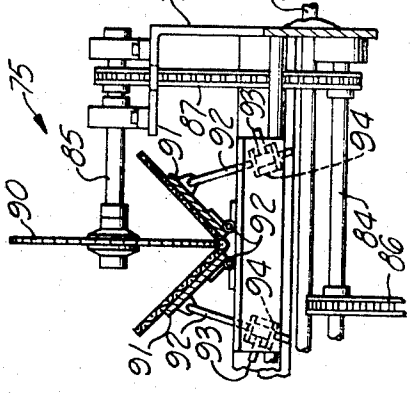


FIG. 6.

FIG. 15.

FIG. 16.

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PORTABLE LATH SLITTING MACHINES

This invention relates to reticulated metal slitting equipment and more particularly to a unique, readily portable slitting and forming machine operated and moved from place-to-place and floor-to-floor of construction projects by one man.

The invention machine comprises a rigid main frame sized for movement through doorways of both residential and office buildings and to be lifted from floor-to-floor on a passenger or small-capacity freight elevator. Movement of the machine is facilitated by a built-in readily retracted and extended carriage having its axis spaced below and close to the center of gravity, the result being that the relatively heavy machine is easily tilted for support on the carriage while being rolled from place to place and on to and off of a cargo truck. For convenience in handling larger sheets of metal stock, the machine includes a number of compactly folding tables hinged along the sides of the machine and extendable to working positions to either side of the operator's work station. The power-driven cutters or slitters are designed to handle one or several sheets of lath simultaneously, severed portions of the material being deflected onto a downwardly inclined surface to one side of the slitting blades to avoid interfering with further slitting operations.

A feature of the machine is the provision of a forming accessory arranged to be driven from the same power source as the stock slitting blades. This accessory is hinged detachably to the main frame and is quickly movable between its active and inactive positions, in the former of which the forming components are conveniently positioned to receive stock fed thereinto by an operator stationed in the same position used for slitting purposes. The forming accessory is quickly and readily adjustable to bend the stock at any one of a wide range of angles. When the forming accessory is in its inactive position, its parts are disposed below the normal working surface of the slitting machine proper. Withdrawal of a single assembly pin permits the accessory to be detached. Accordingly, it is a simple matter to add the bending accessory to the machine at any time without need for making alterations or changes in other components of the machine. Accordingly, it is a primary object of the present invention to provide an improved and unique machine for cutting and forming reticulated sheet metal and, more particularly, expanded metal and metal lathe.

Another object of the invention is the provision of a rugged, compact, readily portable metal lath processing machine readily operated and moved from place to place by one man and operable to slit and shape metal lath ready for installation or use.

Another object of the invention is the provision of a unitary machine having a self-contained power supply arranged to drive reticulated metal slitting and forming components.

Another object of the invention is the provision of a forming accessory for bending metal lath and the like reticulated material to a desired shape.

Another object of the invention is the provision of a lath cutting machine having an extendable and retractable carriage support with convenient operating means for moving it between its operating and nonoperating positions as well as compactly folding work support tables.

These and other more specific objects will appear upon reading the following specification and claims and upon considering in connection therewith the attached drawings to which they relate.

Referring now to the drawing in which a preferred embodiment of the invention is illustrated.

FIG. 1 is a small scale perspective view of one preferred embodiment of the invention slitting machine in the process of being moved between work stations;

FIG. 2 is a perspective view of the machine with its carriage shifted to its retracted position and its collapsing work-supporting members being extended;

FIG. 3 is a view similar to FIG. 2, showing the work-supporting members unfolded and the forming accessory broken away to show details of its storage compartment;

FIG. 4 is a fragmentary top plan view of the main body of the machine with its top surface broken away to show details of the drive components;

FIG. 5 is a vertical sectional view taken along broken line 5–5 on FIG. 4 and showing details of the power drive and of the forming accessory;

FIG. 6 is a fragmentary cross-sectional view taken along line 6–6 on FIG. 5 and showing details of the forming accessory;

FIG. 7 is a vertical sectional view taken along line 7–7 on FIG. 4;

FIG. 8 is a fragmentary cross-sectional view on an enlarged scale taken along line 8–8 on FIG. 7, showing details of the slitter in operation;

FIGS. 9 and 10 are fragmentary side-elevational and cross-sectional views of the slitter blades;

FIG. 11 is a cross-sectional view, taken along line 11–11 on FIG. 5, showing details of the carriage assembly, the solid lines showing the carriage in its normal retracted position and the dot-and-dash lines showing the carriage in extended position;

FIG. 12 is a fragmentary perspective view looking upwardly from beneath a work support surface to show details of the hinge;

FIGS. 13 and 14 are fragmentary sectional views showing details of the lock holding the work surfaces in extended position; and

FIGS. 15 and 16 are fragmentary views of typical metal lath readily processed by the invention machine. Referring more particularly to FIGS. 1, 2 and 3, there is shown a preferred embodiment of the invention machine, designated generally 10, having a main frame 11 formed of welded structural components and having a carriage 12 pivotally connected to the main frame by hinge pins 13. The carriage is releasably lockable in its extended position by a detent pin 15 engageable in an opening 16 of frame 11. The carriage wheels 18 are journaled to pins mounted in the legs of a Y-shaped yoke 19.

The stem of this yoke projects forwardly and is equipped at its end with a self-leveling step 20 pivoted to the yoke by pivot pin 21. This pivot pin is offset to one side of the center of gravity of the foot step with the result that the step tends to pivot clockwise as viewed in FIG. 11. A stop 22 projecting downwardly from the underside of the step engages the end of the yoke to support the step in horizontal position when the carriage is retracted. As the user depresses the step, it continues to remain generally horizontal as yoke 19 is depressed to elevate the forward end of machine 10 about the carriage axis. This arrangement provides an important safety feature by assuring that the foot step remains horizontal throughout the full operating range of the carriage and avoids risk of the operator's foot slipping therefrom.

The main frame 11 preferably has a closed mechanism compartment 24 (FIGS. 2 and 3) overlying carriage 12 and extending across one end of an inclined support rack 25 for slit material. This rack is formed by a series of tubular members having their upper ends shiftable along tubing 25' (FIG. 4) and are inclined downwardly and rearwardly from the forward edge of main frame 11. The lower ends 26 of the tubular members are bent upwardly to any suitable height to prevent severed pieces of sheet material from sliding off the rack until needed.

The slitter mechanism, designated generally 28, includes a pair of cooperating metal cutting blades 52, 53 supported in a manner to be described presently, in a vertical plane between rack 25 and work support surface 27. Additional work supporting surfaces 29, 30, 31 are hinged to main frame 11 and may be extended at the user's option. When extended, these surfaces lie in the plane of work support surface 27.

Referring now more particularly to FIGS. 4 and 5, it is pointed out that mechanism compartment 24 is equipped with a variable speed motor 34 coupled to a speed reducer 35 having an output shaft 36 projecting from either end thereof. A

sprocket 37 affixed to one end of this shaft supports a chain 38 driving a sprocket fixed to shaft 39. Mating gears 40, 40 mounted on shafts 39 and 41 cooperate in driving a sprocket for chain 42 passing over a sprocket fixed to slitter drive shaft 43. Another chain 44 interconnects sprockets mounted on shafts 39 and 45 to drive chain 46 and slitter shaft 47. This latter shaft is journaled crosswise of a very thick and rugged bracket 48 extending along one lateral edge of mechanism compartment 34 and secured rigidly to main frame 11 by a Z-shaped bracket 49 best shown in FIGS. 4 and 8. Bracket 48 and chain drive 46 are normally concealed by a detachable guard shroud 50.

Suitably affixed to shafts 43 and 47 are a pair of thick, heavy-duty slitter blades 52, 53, details of which are best shown in FIGS. 7 to 10. The adjacent faces of these blades are in close running contact with one another and overlap in the manner best indicated in FIGS. 9 and 10. The beveled edges 54 of the blades are deeply notched, as is indicated at 54'. These notches cooperate with one another and with the hardened and tempered rim edges of the blades and of the notches to sever reticulated sheet material fed between the bite of the blades from the forward edge of the machine frame. It will be understood that the blades rotate in opposite directions so as to feed the reticulated material past the blades at a rate dependent on their operating speeds. A deflector member 56 (FIGS. 5, 7, 8) underlying bracket arm 48 is positioned to deflect slit material downwardly onto the inclined material supporting rack 25, the main body of the material remaining on the horizontal top 27 of mechanism compartment 24. It is also pointed out that the blades preferably are mounted as shown with the beveled edge 54 on blade 52 acting to deflect slit material downwardly onto the inclined support tubes 26 whereas the bevel 54 on blade 53 tends to deflect the main body of the sheet overlying top 27 upwardly. This action facilitates the severing operation and assures complete and positive separation of the freshly slit edges of the material and avoids risk of hang-up.

At times, it is important to employ a guide or a fence while feeding the material past the slitter. A suitable fence 59 comprises a strip of angle iron having a U-shaped clip 60 fixed to one end and a reciprocal U-shaped clip 61 at its other end biased toward clip 60 by a tension spring means 62. Clips 60, 61 are sized to embrace the forward and rear edges of table top 27 and serve to hold the fence rigidly in place in any desired position relative to slitting blades 52, 53. When not needed, fence unit 59 is readily detached and laid aside.

The folding tables 29, 30, 31 include rigid sheet metal working surfaces hinged to one another and to main frame 11 in the manner now to be described. For example, work support 29 is hinged to the forward edge of frame 11 to the left of the operating station. Work support 30 is hinged along the right-hand lateral edge of top 27, whereas work support 31 is hinged to the forward longitudinal edge of support 30. The forward corners of supports 29 and 31 are equipped with folding legs 64 in the manner best shown in FIG. 12, the underside of these work supports being provided with brackets 65 having aligned openings into which an accurately machined split pin 66 is driven. This pin has a tapered forward end to facilitate its insertion and is driven home and remains there because of its friction fit either with the holes in the brackets or with those in a cap member secured to the upper end of legs 64. The legs are also provided with a hinging brace 67 of conventional design.

The tables may be locked collapsed against the side of main frame 11 by the simple lock best shown in FIGS. 13 and 14, the lock there illustrated serving to hold work support 31 to support 30. The L-shaped locking member 69 is slidably supported in the frame of support 31 and urged to its retracted position by compression spring 70. Its inner end is provided with a locking detent 71 insertable through a keyhole slot 72 in the cooperating member, as support 30, to which it is to be secured. The lock is first rotated to align detent lug 71 with the keyhole slot whereupon it is pressed through this opening and then rotated to its locking position.

Referring now more particularly to FIGS. 4, 5 and 6, there will be described details of the forming accessory, designated generally 75 and used to bend lath or other reticulated material to a desired shape to fit about a corner or the like. This accessory is a self-contained unitary assembly having a main frame 76 formed with aligned openings along one edge through which a hinge pin 77 is insertable. This pin passes through lugs in the main frame 11 of the machine and has a handle 78 at one end (FIG. 4) to facilitate rapid attachment and detachment of the accessory with respect to the main machine. It will therefore be recognized that the accessory is pivotable about pin 77 while moving between its extended operating position shown in FIGS. 4 and 5 and its inoperative or retracted position indicated by dot-and-dash lines in FIG. 5. The accessory is readily and quickly locked in its extended position by a strut 80 threaded to a bracket 81 on main frame 76. The lower end of the strut seats in a socket 82 of frame 11 and its outer end is provided with a crank 83 to facilitate tightening and loosening the strut.

Bending accessory 75 is equipped with a pair of rotary shafts 84, 85 suitably journaled in end frame 76 and are driven from one end of main drive shaft 36 by chain belts 86, 87. Chain 86 is readily disconnected from its driving sprocket upon loosening strut 80. When the forming accessory is not in use, it may be folded downwardly to its retracted position whereupon its drive chain 86 is detached from its driving sprocket and stored compactly within compartment 24 in the manner indicated in FIG. 5.

Advance of sheet metal undergoing forming is accomplished by a serrated driving disk 90 clamped to the outboard end of shaft 85 in a plane merging with the longitudinal junction between two adjustable forming plates 91 pivoted to main frame 11 by hinges 92. Plates 91, as here shown, are generally triangular in shape and their pointed forward ends terminate somewhat forwardly of the entrance to feeding disk 90, as is clearly evident from FIGS. 4 and 5.

The means for supporting each of plates 91 at any desired angle relative to the face of feed disk 90 comprises a pair of pivoting struts 92 passing loosely through tubes socketed in brackets 94 secured to frame 76. Thumb nuts 93 mounted in the wall of these tubes can be operated to clamp the struts in any desired position along the associated tube. It will be understood that a turnbuckle or other equivalent means may be employed in connection with struts 92 to adjust the length thereof and thereby vary the angular position of supports 91 relative to feed disk 90. As illustrated in FIG. 6, plates 91 are adjusted to lie at an angle of 45°to either side of feed disk 90. When so positioned, the accessory operates to form a 90°angle in metal lath or other reticulated sheet material as the same is advanced through the accessory.

Referring to FIGS. 15 and 16, there is shown one of many equivalent forms of metal lath or the like reticulated material readily cut to size and bent to form by machine 10 and accessory 75. The lath illustrated includes criss crossing wires 96 spot welded to one another and to a lesser number of main reinforcing wires 97. Interlocked between the welds of these several wires is a web of notched craft paper 98, both paper webbing 98 and the metal components being easily severed by blades 52, 53. Likewise, such material, and many other forms of reticulated and expanded metal, are readily formed and bent to a desired shape while being power-advanced between plates 91 by the notched feeding disk 90 of accessory 75.

OPERATION

The operation of the machine 10 will be readily understood from the foregoing description of its components and their operative relationship to one another. The machine is quickly moved by one man onto a light truck and from there into a construction project using carriage 12 in its extended position. This is accomplished as the operator steps against the self-leveling step 20 at the end of yoke 19 thereby quickly elevating the heavier end of the machine onto the carriage where it is locked by pressing detent 15 into opening 16 in frame 11

(FIG. 11). All except a minor portion of the machine weight is then supported by carriage wheels 18 and the operator easily pivots the machine onto the carriage by applying a small lifting force to the remote end of the frame in the manner shown in FIG. 1.

After the machine has been moved to a place of use, the operator places his foot pressure against step 20 while removing detent 15 thereby allowing the carriage to shift to its retracted position with the weight of the machine immovably supported on the lower ends of its legs. A power service cord is then connected to socket 100 (FIG. 5) and service cord 101 of a foot-operated, variable speed control 102 is placed on the floor adjacent the operator's station forwardly of table top 27.

Usually, the operator will wish to use the auxiliary work supports 29, 30 and 31. In this event, one or more of these is quickly unfolded from along the side of the main frame and the legs 64 are opened and locked in extended position. Also, the tubular members forming the inclined workpiece support 25 may be shifted sidewise relative to one another along slide rod 25' (FIG. 4). In this manner, the support tubes can be shifted closer or further apart depending upon the size of the slit material they are required to support.

To place the machine in operation, the operator closes master switch button 105, conveniently located on the front of the machine, conditioning the motor for operation as soon as the operator depresses foot pedal 106 of the variable speed control 102. The motor operates with increasing speed depending upon the extent to which pedal 106 is depressed. Slitting blades 52, 53 then rotate at a desired speed to advance material forwardly across the top of the machine, the severed left-hand portion of the material located to the left of blades 52, 53 being deflected downwardly by deflector 56 and falling onto the inclined surfaces of tubes 25. Either a single sheet, or as many as six or more superimposed sheets, of reticulated metal are readily cut to size simultaneously.

A severed sheet of material is then bent to shape along a desired crease line by inserting the sheet forwardly over the pointed end of the trough formed by members 91 of forming accessory 75. As the material engages the notched rim of feed disk 90, it is then depressed in the manner made clear by FIG. 6 and progressively creased. Frequently the material is bent to fit inside or outside corners of rooms and the opposite halves of the piece lie at right angles to one another. However, it not infrequently happens that the piece must be formed at a different angle and this is readily accomplished by loosening thumb nuts 93 and adjusting struts 92 to support plates 91 at the proper angle.

When desiring to move the machine to a different floor or a different room, the operator quickly folds the extendable work supports to collapsed position, detaches the power service cord, lowers carriage 12 to its extended position and moves the machine as described above.

While the particular portable lath slitting and forming machine herein shown and disclosed in detail is full capable of attaining the objects and providing the advantages hereinbefore stated, it is to be understood that it is merely illustrative of the presently preferred embodiments of the invention and that no limitations are intended to the detail of construction or design herein shown other than as defined in the appended claims.

I claim:

1. A self-contained, compact metal lath cutting machine readily rolled from place-to-place by one man, said machine having a main frame pivotally supported at one end on wheel means, first and second stock-supporting means crosswise of the opposite ends of said main body, said first stock-supporting means being generally horizontal and said second stock-supporting means being inclined downwardly and rearwardly from a level adjacent one upper edge of said main frame to support severed stock in an inclined plane generally below said first stock-supporting means, and a pair of oppositely driven rotary metal cutting disks having their rim edges overlapped and in close running face-to-face fit in a vertical plane passing between said first and second stock-supporting means and effective to sever metallic lath as the same passes between the overlapped edges of said cutter disks.

2. The combination defined in claim 1 characterized in that said cutting disks have thick beveled edges with the high side of the bevel terminating on the adjacent faces of said disks, and said disks having their axes vertically spaced from one another and the blade more remote from said horizontal stock supporting surface being uppermost whereby the beveled edge on the lower side thereof is disposed to deflect slit portions of sheet material downwardly toward said inclined stock supporting surface.

3. The combination defined in claim 1 characterized in that said cutter disks have thick beveled edges and are mounted on vertically spaced parallel shafts with the beveled edges disposed to deflect freshly slit portions of sheet material apart to prevent hang-up between said slit edges.

4. A self-contained metal lath cutting machine supported at one end on wheels means and adapted to be rolled from place to place by one man, said machine having a rigid frame supporting driving motor means connected to drive a pair of notched overlapping metal cutter blades all located near the carriage-supported end of said machine, and first and second lath supporting means located to either side of a vertical plane traversing the axis of said cutter blades, said first lath supporting means being horizontal and located generally in the cutting plane of the overlapped edges of said cutter blades and said second lath supporting means being inclined downwardly and rearwardly from the forward portion of said first supporting surface.

5. A self-contained power-driven lath cutting machine as defined in claim 4 characterized in that said wheel means has an axis extending crosswise of one end of said main frame and includes means for shifting said wheel means between the retracted and extended positions thereof with the axis thereof so positioned relative to the longitudinal center of gravity of said machine that one man can easily apply a lifting force to the other end of said machine and tilt the same upwardly about the axis of said wheel means.

6. A slitting machine as defined in claim 4 characterized in the provision of a plurality of collapsible work-supporting table means operatively connected to said main frame and including means permitting said table means to be stored compactly against said main frame when not needed and to be extended to workpiece supporting positions when said machine is in use, said machine when said table means are stored thereagainst being readily movable through conventional office-size doorways and through the conventional size doors of passenger elevators for convenience in moving said machine from floor-to-floor as installation of lathing progresses.

7. A slitting machine as defined in claim 6 characterized in that said plurality of collapsible table means includes a first and second table means extendable outwardly and forwardly from the forward edge of said machine and spaced apart laterally to either side of an operator's station closely beside said cutting blades, and third table means extendable outwardly beyond one end of said machine and rearwardly of said second table means.

8. A slitting machine as defined in claim 4 characterized in that said wheel means includes a pair of wheels carried on lever means pivotally connected to said main frame along a pivot axis parallel to but offset from the axis of said wheels, and the other end of said lever means being manually responsive to pressure applied by an operator to shift said pair of wheels from the retracted to the extended position thereof for rolling movement of said slitting machine to a different location.

9. A slitting machine as defined in claim 8 characterized in the provision of manually controlled means for releasably locking said pair of wheels in their extended machine-supported position.

10. A slitting machine as defined in claim 8 characterized in the provision of self-leveling foot engaging means on said lever

means operable to remain generally level as said lever means is pivoted by foot pressure between its extreme operating positions.

11. A slitting machine as defined in claim 10 characterized in that said self-leveling foot engaging means includes means pivotally connecting the same crosswise of said lever means along an axis offset to one side of the center of gravity of said foot engaging means and including means for holding said foot means normally in a convenient position for engagement by the operator's foot.

12. A slitting machine as defined in claim 4 characterized in that said motor means is supported on said rigid frame beneath said horizontal lath supporting means and adjacent the axis of said wheel means.

13. A slitting machine as defined in claim 4 characterized in that said metal cutter blades are located inwardly from the front edge of said machine.