Dec. 27, 1949 W. H. WILCOX 2,492,250

LEADED SLAT UNIT FORMING MACHINE

Filed Oct. 21, 1947 4 Sheets-Sheet 1

Fig. 1

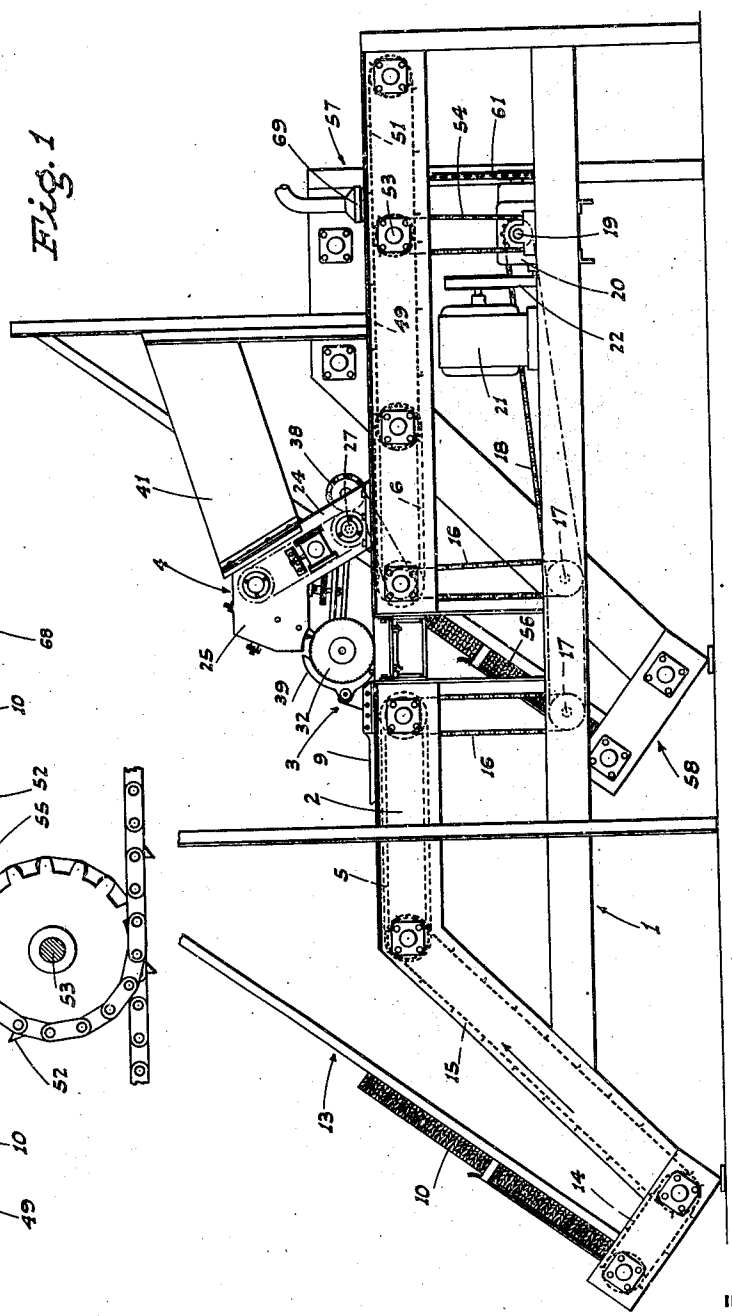

Fig. 5

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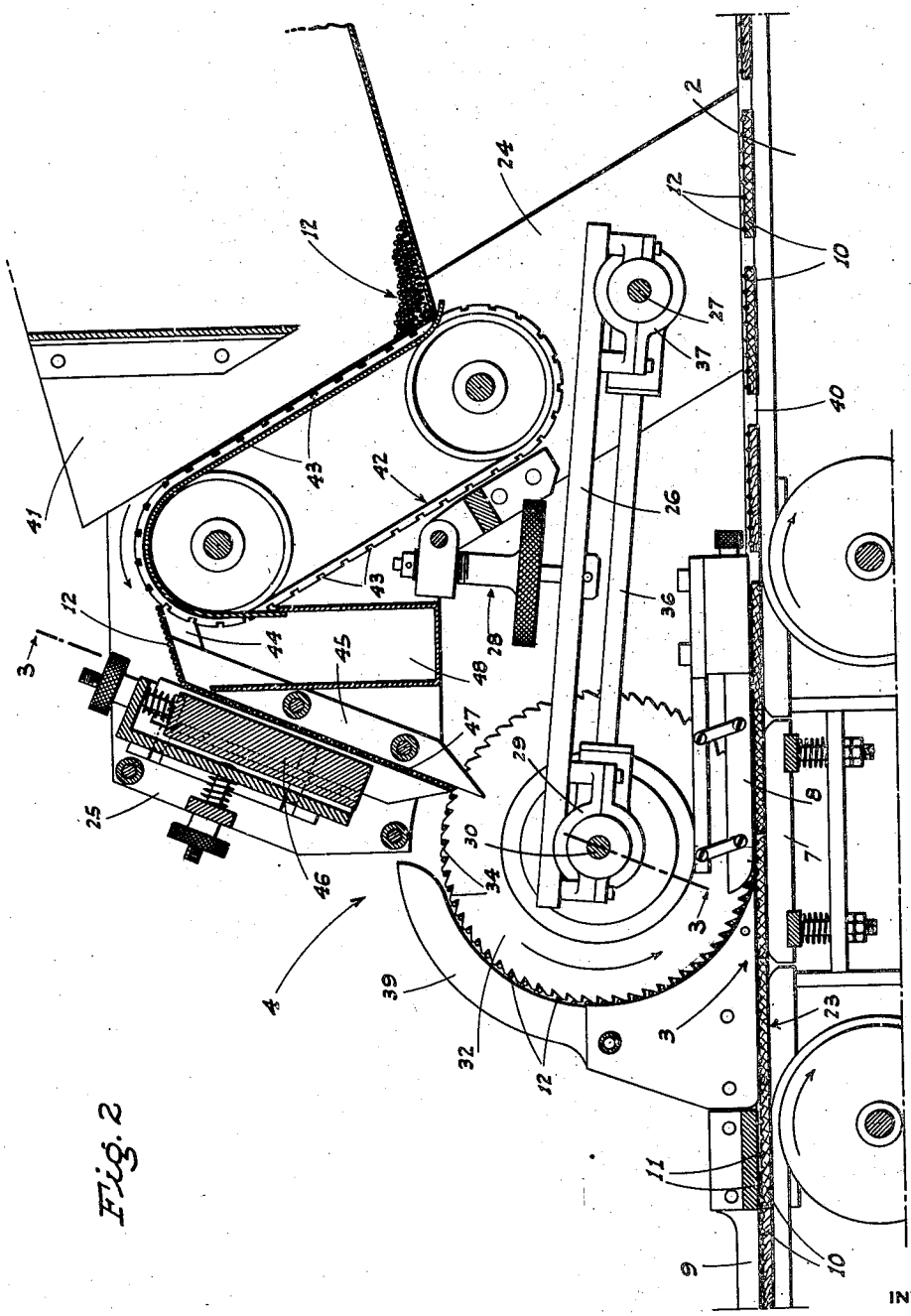

Fig. 2

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LEADED SLAT UNIT FORMING MACHINE

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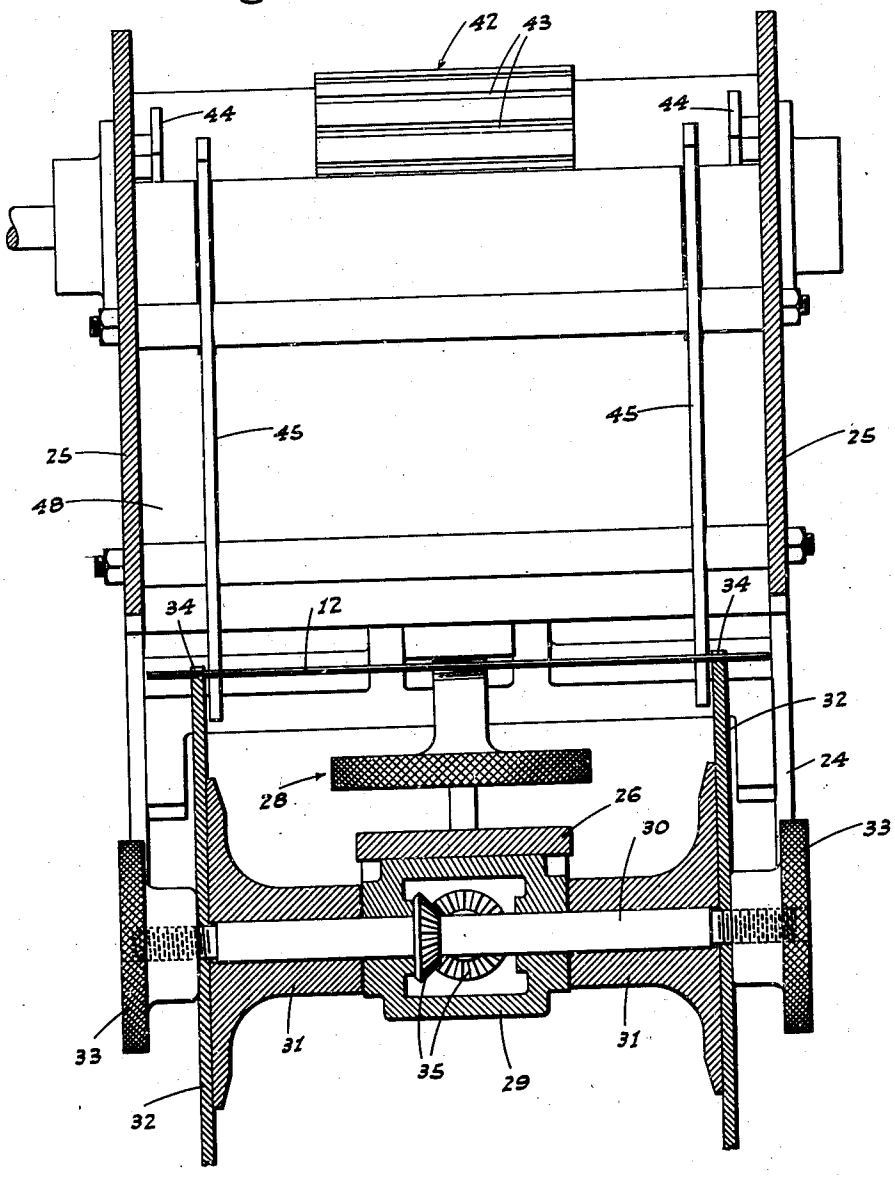
Fig. 3



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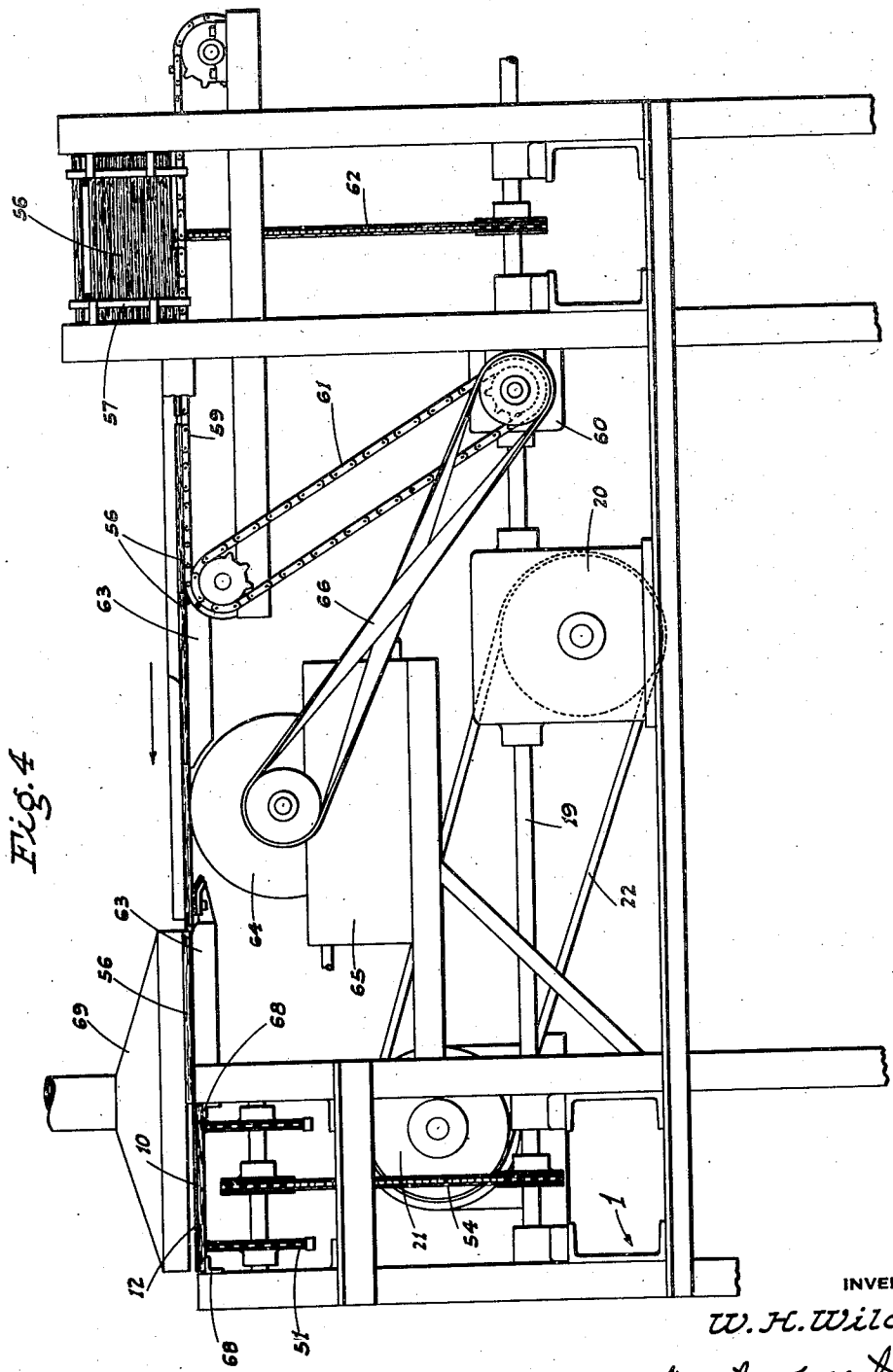

Fig. 4

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2,492,250

LEADED SLAT UNIT FORMING MACHINE

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Application October 21, 1947, Serial No. 781,208

12 Claims. (Cl. 154—1)

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The present invention relates in general to an improved machine for use in the wooden pencil manufacturing industry.

One of the steps in the manufacture of wooden pencils comprises placing initially separate leads in a plurality of semi-circular, transversely spaced grooves extending lengthwise in one face of a wooden pencil slat, and then affixing, by gluing, another similarly grooved slat in matching relation to said face whereby to snugly enclose the leads and form a unit from which a number of rough cut pencils may be sawed.

In particular the present invention is directed to, and it is an object to provide, a novel power driven machine operative to automatically assemble such slat and pencil lead units, as in the preceding paragraph, preparatory to sawing such units into rough cut pencils.

Another object of the invention is to provide a machine, as above, which comprises, in novel combination, a conveyor table adapted to feed a row of the initially grooved slats in a predetermined path, and a rotary, lead laying mechanism cooperating with such row, in timed relation, whereby to deposit a single, initially separate pencil lead in each groove with passage of the slats.

A further object of the invention is to provide a machine, of the type described, which includes, beyond the lead laying mechanism, a novel slat feeding mechanism arranged to automatically apply to each leaded slat of the row, the other and cooperating matching slat which completes the slat unit; such other slat preferably carrying the glue substance which adheres the engaged slats in unitary relation.

An additional object of the invention is to provide a rotary, lead laying mechanism, for the above machine, which is of unique construction and operation, including a rotary disc assembly peripherally notched for the reception, and feeding in accurately timed relation, of the pencil leads to the grooved slats on the conveyor table.

A further object of the invention is to provide a practical, economical and smooth operating machine, and one which will be exceedingly effective for the purpose for which it is designed.

These objects are accomplished by means of such structure and relative arrangement of parts as will fully appear by a perusal of the following specification and claims.

In the drawings:

Fig. 1 is a side elevation of the machine.

Fig. 2 is an enlarged, fragmentary sectional elevation of the rotary, lead laying mechanism.

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Fig. 3 is a cross section, enlarged, on line 3—3 of Fig. 2.

Fig. 4 is an enlarged rear end view of the machine, partly broken away.

Fig. 5 is an enlarged fragmentary elevation of the slat conveyor system, beyond the lead laying mechanism.

Referring now more particularly to the characters of reference on the drawings, the machine comprises an upstanding, horizontally elongated main frame 1 supported from the floor and including transversely spaced side beams 2, between which a horizontal conveyor table assembly 3 is mounted.

The leading laying mechanism is indicated generally at 4, and cooperates with said conveyor table assembly 3 from above and intermediate the ends of the latter. Such conveyor table assembly comprises a pair of endless, longitudinally extending belt conveyors 5 and 6 disposed ahead of and beyond, respectively, the lead laying mechanism 4.

Adjacent ends of the belt conveyors 5 and 6 are spaced, and between such ends the conveyor table assembly 3 includes a yieldable platform 7, and transversely spaced slat hold-down shoes 8 floatably cooperate therewith from above.

Some distance ahead of the slat hold-down shoes 8, and the lead laying mechanism 4, there are transversely spaced, longitudinally extending slat hold-down fingers 9 disposed above the edge portions of the upper run of the endless belt conveyor 5 a distance slightly greater than the thickness of a pencil slat.

The pencil slats 10 are rectangular by elongated, and on one face include a plurality of transversely spaced, longitudinally extending semi-circular grooves 11 preformed in said slats.

One operational purpose of the present machine is to place, automatically, in each of such grooves 11 of the slats 10, an initially separate length of pencil lead; these leads being indicated at 12, and the same are of a length approximating the length of said slats.

At the front end of the machine the latter includes, in connection with the main frame 1, an upstanding, forwardly inclined slat hopper 13 in which a multiplicity of the slats 10 are disposed transversely, with the grooved faces upward. The slats 10 are fed, one at a time and in spaced relation from the bottom of the hopper 13, by an endless transfer conveyor 14 of cleat type which delivers in turn to the lower end of an endless cleat-type elevator conveyor 15 disposed at a forward and upward slope and arranged to

deliver the slats onto the upper run of the endless belt conveyor 5.

The slats as fed onto the upper run of the endless belt conveyor 5 are disposed transversely on the latter in confinement between the side beams 2, and further the speed of the conveyors is such that said slats abut in edge-to-edge relation on said upper run, whereby the slats feed in a continuous or unbroken row below the lead laying mechanism 4.

The endless belt conveyors 5 and 6 are driven by endless chain and sprocket units 16 from cross shafts 17, and the latter are in turn actuated by another endless chain and sprocket unit 18 which is driven from a countershaft 19 journaled transversely in the frame. The countershaft 19 is driven from a gear box 20 actuated from an electric motor 21 by an endless belt 22. The endless elevator conveyor 15 drives from the conveyor 5, while the endless transfer conveyor 14 drives from said elevator conveyor 15.

With the above arrangement the several described conveyors may be run in desired predetermined timed relation. This timed relation is such that the row of slats on the conveyor table assembly 3 is continuous or unbroken ahead of, and below, the lead laying mechanism, but beyond the latter and on the endless belt conveyor 6 the slats are spaced apart somewhat, as shown. This is accomplished by a differential in speed between the conveyors 5 and 6.

The row of slats on the conveyor table assembly 3 is indicated generally at 23, and as such row of slats passes over the yieldable platform 7 in held-down relation by the shoes 8, the lead laying mechanism 4 functions in automatic, accurately-timed relation to deposit a single lead 12 in each of the grooves 11. This lead laying mechanism 4 is constructed and functions as follows:

Somewhat beyond the yieldable platform 7, the main frame 1 includes a pair of upstanding, transversely spaced side posts 24 fitted at the top with rearwardly extending side plates 25 generally above the platform 7. A longitudinal, supporting arm 26 is journaled at one end in connection with a cross shaft 27 for vertical adjustment, and extends rearwardly from said cross shaft to a termination in overhanging relation to said yieldable platform 7, but below the side plates 25. This supporting arm 26 is vertically adjustable by means of an adjustment device, indicated generally at 28.

At its rearmost or free end the supporting arm 26, which is disposed lengthwise, and centrally between the sides, of the conveyor table assembly 3, is fitted with a gear box 29, through which a cross shaft 30 extends in journaled relation. On opposite sides of the gear box 29 the cross shaft 30 is provided with fixed hubs 31, and lead laying discs 32 of circular configuration are secured against the outer ends of the hubs 31 by hand nuts 33 threaded onto projecting end portions of said cross shaft 30. These lead laying discs 32 are peripherally notched, as at 34, with the notches equally spaced and preferably of saw-tooth configuration therebetween. Corresponding notches 34 are alined transversely of the machine, and the discs 32 run adjacent but laterally inwardly of the slat hold-down shoes 8.

The cross shaft 30 is driven by a bevel gear unit 35 in the gear box 29, which bevel gear unit 35 is in turn operated by a longitudinal shaft 36 which extends from the gear box 29 to a similar gear box 37 associated with the cross shaft 27;

there being a gear system (not shown) between said cross shaft 27 and the longitudinal shaft 36 within the gear box 37.

The cross shaft 27 is driven by an endless chain and sprocket unit 38 from the endless belt conveyor 6. With this driving arrangement, the lead laying discs 32 are driven at a peripheral speed exactly the same as the speed of the advancing slat row 23.

By mechanism hereinafter described, the individual leads 12 are fed to the assembly of the lead laying discs 32 at the top thereof, with each lead engaging in corresponding notches 34 and spanning between said discs; escape of the leads from the discs being prevented, on their downward course or path of movement, by an upstanding, lead retaining guard 39. As each lead reaches the bottom of the lead laying disc assembly, it escapes the discs 32 and falls into a then matching one of the grooves 11; the arm 26 being vertically adjusted so that the discs 32 run close to the grooved upper surface of the adjacent slat 10 on the yieldable platform 7. Thus, as the row 23 of slats 10 pass below the rotating lead laying disc assembly, the grooves 11 have leads automatically placed therein, and the leads thenceforth travel with the slats of said row onto the endless belt conveyor 6. On the upper run of the endless belt conveyor 6 the slats are spaced apart or gapped, as at 40, as previously described.

The assembly of the lead laying discs 32 is supplied with the individual leads 12 by means of the following arrangement:

Generally above the cross shaft 27 and supported between the side posts 24 is a hopper box 41 in which a supply of the leads 12 is disposed transversely of the machine. An endless, flexible feeder belt conveyor 42 is journaled between the side posts 24 with the adjacent and upwardly moving run of said belt conveyor working within the hopper box 41. Such endless feeder belt conveyor 42 is transversely grooved, as at 43, and each groove picks up one of the leads 12 as said one run passes through the hopper box 41. At the upper end of the conveyor 42, the leads 12 transfer from the grooves 41 onto a pair of transversely spaced cross-over bars 44 mounted in connection with the side plates 25, and thence said leads extend as a stack at a downward and rearward incline on transversely spaced stack supporting bars 45 which lead downwardly to corresponding discs 32 extending laterally inwardly of the same and to a termination beyond the peripheries thereof. The stack of leads 12 as supported by the bars 45 is held against deformation by an adjustable guide plate structure 46.

The stack of leads is indicated generally at 47, and with the described arrangement for the support thereof, the lowermost lead in such stack is successively picked off and carried away by the assembly of the discs 32 for the lead laying operation previously described.

The endless feeder belt conveyor 42 is driven at such speed as to maintain the stack 47 substantially full at all times, and the cross-over bars 44 are spaced apart such distance that too short leads which may be delivered by the conveyor 42 onto said bars do not remain supported thereby, but fall downwardly into a reject receptacle 48. The conveyor 42 is driven at proper speed, and in any suitable manner, from the endless chain and sprocket unit 38 which drives the cross shaft 27.

After the slats 10 have the leads 12 placed into the grooves 11, and said slats advance on the conveyor 6 with the gaps 40 therebetween, said

slats are picked up at the discharge end of said conveyor 6 by an endless chain conveyor 49 of cleat type; the cleats being spaced about the conveyor equally, and being shown at 50. The endless chain conveyor 49 delivers directly onto a further endless chain conveyor 51, also of cleat type and including cleats 52; the cleats 52 of the conveyor 51 running in trailing relation to the corresponding cleats 50 of the conveyor 49 so that as said leaded slats deliver onto the conveyor 51 from the conveyor 49, there is a definite dwell or period when said slats remain stationary. The common cross shaft 53 of the conveyors 49 and 51 is driven by an endless chain and sprocket unit 54 from the countershaft 19, whereby to provide proper timed driving of said conveyors.

As the upwardly facing and leaded slats 10 reach the point of dwell, indicated at 55, and at which point the leaded slats are still in transversely extending relation, a further or top matching slat 56 is applied to complete the leaded slat unit. The top slat preferably carries the adhesive which adheres each top slat 56 to the corresponding leaded or bottom slat 10.

The top slats 56, which are pre-grooved and disposed with the grooved face downwardly, are fed—in predetermined timed relation—to engage upon corresponding grooved or bottom slats 10 by means of the following mechanism:

Laterally of the point of dwell 55 of the slats 10 on the conveyor 51, the main frame 1 is formed with a hopper 57 adapted to receive the top slats 56 in a stack wherein said slats extend lengthwise transversely of the machine. This slat hopper 57 is maintained filled with slats in any suitable manner, as by means of a hopper and conveyor system, indicated generally at 58, of the same type as the system which includes the hopper 13 and conveyors 14 and 15.

The slats 56 from the hopper 57 are intermittently fed from the bottom of the latter transversely of the machine toward the conveyor 51, by an endless, laterally extending forward conveyor 59 of cleat type; the slats in the row fed by the conveyor 59 being in adjacent end-to-end relation. The conveyor 59 is driven from a gear box 60 by an endless chain and sprocket unit 61, and said gear box derives its power from the countershaft 19.

An endless chain and sprocket unit 62, also driven from the countershaft 19, provides the means for power actuating the hopper and conveyor system 58.

The endless feed conveyor 59 terminates short of the conveyor 51, and between these elements the row of the slats 56, in end-to-end relation, is supported by transversely spaced rails 63. These rails have a gap between adjacent ends, and a glue applying wheel 64 runs in said gap in engagement with the downwardly facing, grooved faces of the slats 56 in the row, whereby to apply the glue to said faces. The wheel 64 runs at the bottom in a glue tank 65 and said wheel is rotated from the gear box 60 by an endless belt and pulley unit 66.

After application of the glue thereto, the slats 56 are advanced laterally of the conveyor 51, and in predetermined timed relation, onto the corresponding grooved slat 10 at the point of dwell 55. The slats 56 are thus fed into matching engagement onto the leaded slats 10 to complete the leaded slat units, indicated at 67, from which rough-cut pencils are adapted to be sawed during a subsequent operational step. From the point of dwell 55 the completed leaded slat units 57 feed

from the machine as they discharge from the conveyor 51.

In order to assure of their disposition in a proper horizontal plane, the slats 10 run on transversely spaced rails 68, particularly at and adjacent the point of dwell 55. If found necessary, a suction hood 69 may be mounted directly over said point of dwell, whereby to impart a slight lift to the top slats 56 as each thereof shifts laterally of the machine over the corresponding, leaded bottom slat 10; the slats after engagement moving or sliding out from under said hood 69 without difficulty.

The described machine provides an automatic, smooth operating mechanism for the formation of leaded slat units, each including the pair of matchingly grooved slats with a lead disposed in each groove, and with the slats adhered together.

From the foregoing description it will be readily seen that there has been produced such a device as substantially fulfills the objects of the invention, as set forth herein.

While this specification sets forth in detail the present and preferred construction of the device, still in practice such deviations from such detail may be resorted to as do not form a departure from the spirit of the invention, as defined by the appended claims.

Having thus described the invention, the following is claimed as new and useful, and upon which Letters Patent are desired:

1. A leaded slat unit forming machine including a supporting frame, a conveyor table mounted on the frame adapted to feed pre-grooved slats along a predetermined path, with the grooved face of said slats upward, a pencil lead laying mechanism mounted above said path in adjacent relation to the latter, said mechanism being operative to deposit pencil leads in the grooves of the slats so fed, another mechanism cooperating with the conveyor table beyond the lead laying mechanism operative to feed other pre-grooved slats, with their grooved faces downward into matching face to face engagement with corresponding ones of the leaded first named slats, and means operative to drive said conveyor table and mechanisms in timed relation; said conveyor table including a conveyor system arranged so that the leaded first named slats occupy a point of dwell beyond the lead laying mechanism, and said other mechanism being timed in its operation to feed said other slats onto the corresponding ones of the leaded first named slats at such point.

2. A leaded slat unit forming machine including a supporting frame, a conveyor table mounted on the frame adapted to feed pre-grooved slats in a row along a predetermined path, the slats having their grooved faces upward and the grooves extending transversely of the direction of travel, a pencil lead laying mechanism mounted above said path in adjacent relation to the latter, said mechanism being operative to deposit pencil leads in the grooves of the slats so fed, and means arranged to drive the conveyor table and lead laying mechanism in timed relation; said lead laying mechanism including a supporting arm extending lengthwise above the row, means pivoting said arm for vertical swinging motion, a pair of transversely spaced discs journaled on the cross shaft, said discs being correspondingly peripherally notched, means to deliver pencil leads into corresponding notches of said discs above the

low point thereof and with the leads spanning between said discs, and means to prevent escape of the leads from said notches until substantially the low point of the discs is reached, the leads then feeding from the discs one at a time but successively into the grooves with movement of said row and rotation of said discs.

3. A leaded slat unit forming machine including a supporting frame, a conveyor table mounted on the frame adapted to feed pre-grooved slats in a row along a predetermined path, the slats having their grooved faces upward and the grooves extending transversely of the direction of travel, a pencil lead laying mechanism mounted above said path in adjacent relation to the latter, said mechanism being operative to deposit pencil leads in the grooves of the slats so fed, and means arranged to drive the conveyor table and lead laying mechanism in timed relation; said lead laying mechanism including a driven cross shaft journaled above said row, a supporting arm pivoted on the driven cross shaft and extending lengthwise of the row, means to vertically adjust the arm, a separate cross shaft journaled on the arm, drive means between said cross shafts, a pair of transversely spaced discs secured on said separate cross shaft, said discs being correspondingly peripherally notched, means to deliver pencil leads into corresponding notches of said discs above the low point thereof and with the leads spanning between said discs, and means to prevent escape of the leads from said notches until substantially the low point of the discs is reached, the leads then feeding from the discs one at a time but successively into the grooves with movement of said row and rotation of said discs.

4. A leaded slat unit forming machine including a supporting frame, a conveyor table mounted on the frame adapted to feed pre-grooved slats in a row along a predetermined path, the slats having their grooved faces upward and the grooves extending transversely of the direction of travel, a pencil lead laying mechanism mounted above said path in adjacent relation to the latter, said mechanism being operative to deposit pencil leads in the grooves of the slats so fed, and means arranged to drive the conveyor table and lead laying mechanism in timed relation; said lead laying mechanism including a rotary unit disposed to feed leads one at a time but succesively into the grooves with movement of said row and rotation of said unit, the rotary unit being circumferentially notched with the notches parallel to the axis of rotation, supporting means for a stack of transversely extending leads, the lower end of said stack riding the peripherally notched rotary unit to deliver leads into said notches, means to prevent escape of said leads from the notches until substantially the low point of the rotary unit is reached, a hopper for a quantity of pencil leads, and means including an endless conveyor to feed leads from the hopper to the top of said stack, such endless conveyor being transversely grooved and one run traveling in the hopper in lead pick-up relation.

5. A leaded slat unit forming machine including a supporting frame, a conveyor table mounted on the frame adapted to feed pre-grooved slats in a row along a predetermined path, the slats having their grooved faces upward and the grooves extending transversely of the direction of travel, a pencil lead laying mechanism mounted above said path in adjacent relation to the latter, said mechanism being operative to deposit

pencil leads in the grooves of the slats so fed, and means arranged to drive the conveyor table and lead laying mechanism in timed relation; said lead laying mechanism including a rotary unit disposed to feed leads one at a time but successively into the grooves with movement of said row and rotation of said unit, the rotary unit being circumferentially notched with the notches parallel to the axis of rotation, supporting means for a stack of transversely extending leads, the lower end of said stack riding the peripherally notched rotary unit to deliver leads into said notches, means to prevent escape of said leads from the notches until substantially the low point of the rotary unit is reached, a hopper for a quantity of pencil leads, and means to feed leads from the hopper to the top of said stack including a pair of transversely spaced bars over which the fed leads must traverse in supported relation adjacent their ends, there being a receptacle below said bars to catch too short leads which fall between said bars.

6. A leaded slat unit forming machine including a supporting frame, a conveyor table mounted on the frame adapted to feed pre-grooved slats in a row along a predetermined path, the slats having their grooved faces upward and the grooves extending transversely of the direction of travel, a pencil lead laying mechanism mounted above said path in adjacent relation to the latter, said mechanism being operative to deposit pencil leads in the grooves of the slats so fed, and means arranged to drive the conveyor table and lead laying mechanism in timed relation; said lead laying mechanism including a rotary unit disposed to feed leads one at a time but successively into the grooves with movement of said row and rotation of said unit, the rotary unit being circumferentially notched with the notches parallel to the axis of rotation, supporting means for a stack of transversely extending leads, the lower end of said stack riding the peripherally notched rotary unit to deliver leads into said notches, means to prevent escape of said leads from the notches until substantially the low point of the rotary unit is reached, a hopper for pencil leads, said hopper being mounted in spaced relation to the stack lengthwise of the machine, and endless belt conveyor journaled in upstanding relation between the hopper and stack, the upwardly moving run of said conveyor being transversely grooved and passing through the hopper in lead pick-up relation, and means to transfer the picked-up leads from said conveyor to the stack.

7. In combination, a conveyor system adapted to feed a row of upwardly facing, pre-grooved pencil slats in a row, the slats being fed through one portion of their path in abutment and through a following portion of said path in spaced relation, said conveyor system feeding the row continuously through said one portion and with a dwell at one point in said other portion, a pencil lead laying mechanism operative to deposit leads in the grooves of said slats as they move through said one portion of said path, and another mechanism operative to apply other pre-grooved slats in matching relation to corresponding ones of said leaded first named slats at said point of dwell.

8. In combination, a conveyor system adapted to feed a row of upwardly facing, pre-grooved pencil slats in a row, the slats being fed through one portion of their path in abutment and through a following portion of said path in spaced

relation, said conveyor system feeding the row continuously through said one portion and with a dwell at one point in said other portion, a pencil lead laying mechanism operative to deposit leads in the grooves of said slats as they move through said one portion of said path, and another mechanism operative to apply other pregrooved slats in matching relation to corresponding ones of said leaded first named slats at said point of dwell; the lead laying mechanism including a rotary unit cooperating with the row of slats, and said other mechanism including a slat hopper and a conveyor to feed said other slats from the hopper to said point of dwell.

9. A leaded slat unit forming machine comprising a frame, a first driven conveyor mounted in the frame, a second driven conveyor mounted in the frame in alinement with but spaced from the first conveyor, a yieldable platform disposed in the space between the conveyors, a pencil lead laying mechanism disposed immediately above the platform, means to feed grooved pencil slats onto the first conveyor whereby the movement of such first conveyor will move the slats across the platform and onto the second conveyor, and means effective to operate the pencil lead laying mechanism in timed relation to the slat movement to deposit leads into the grooves of a slat as the latter passes across the platform.

10. A machine as in claim 9 including yieldable slat hold down shoes mounted on the frame and overhanging the platform.

11. A machine as in claim 9 in which the movement of the second conveyor is timed to be slightly slower than the movement of the first conveyor.

12. A machine as in claim 11 including a third and fourth conveyor both of the cleat type, all of said conveyors being in alinement and arranged so that slats will be progressively fed from one conveyor to the other, the cleats on the fourth conveyor running in trailing relation to the cleats on the third conveyor whereby to provide a dwell on the fourth conveyor, and means to attach a second slat in matching relation to a slat as the latter is positioned at said dwell.

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