Aug. 30, 1949. F. R. CLARK 2,480,395

WEAVING MACHINE

Filed March 29, 1947 6 Sheets-Sheet 1

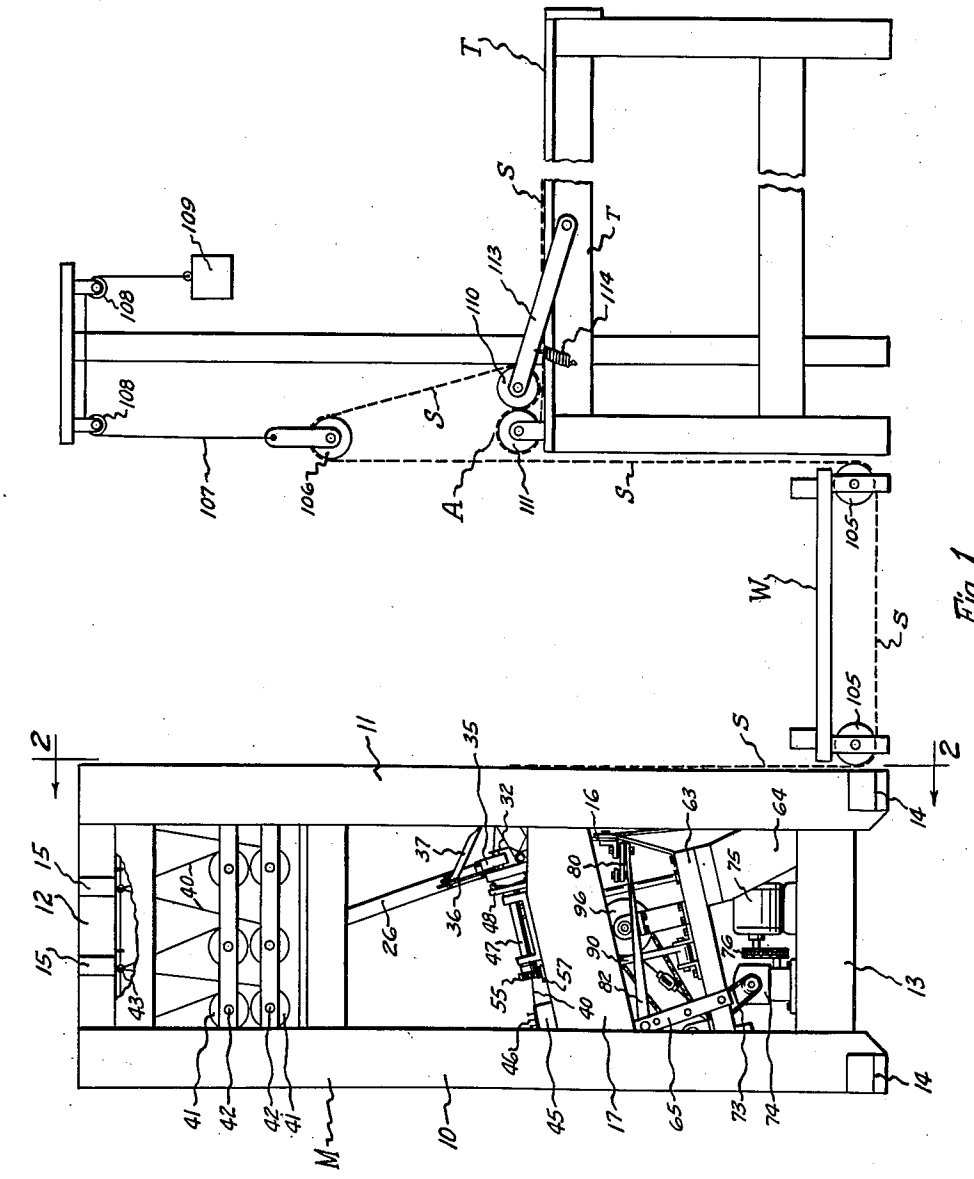


Fig. 1

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BY Hastings & Kelley

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WEAVING MACHINE

Filed March 29, 1947 6 Sheets-Sheet 2

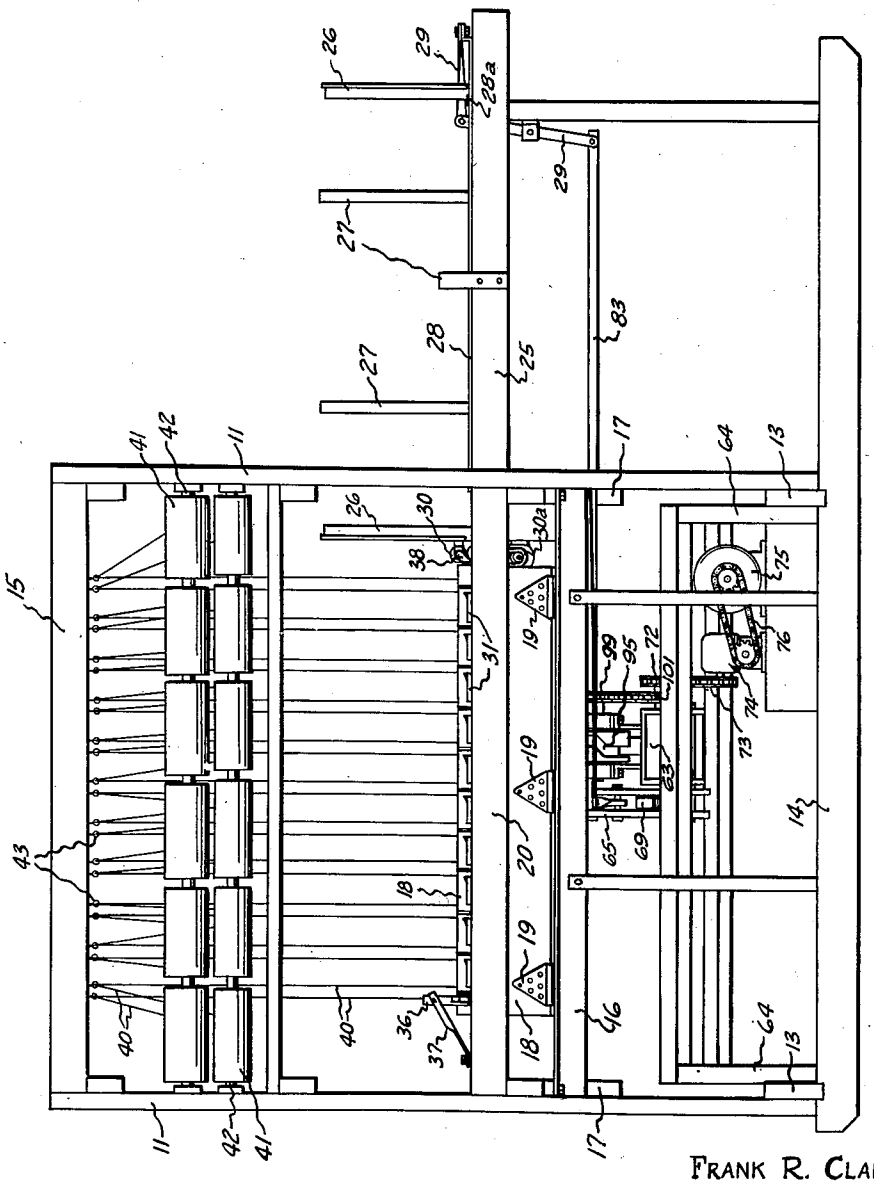


Fig. 2

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WEAVING MACHINE

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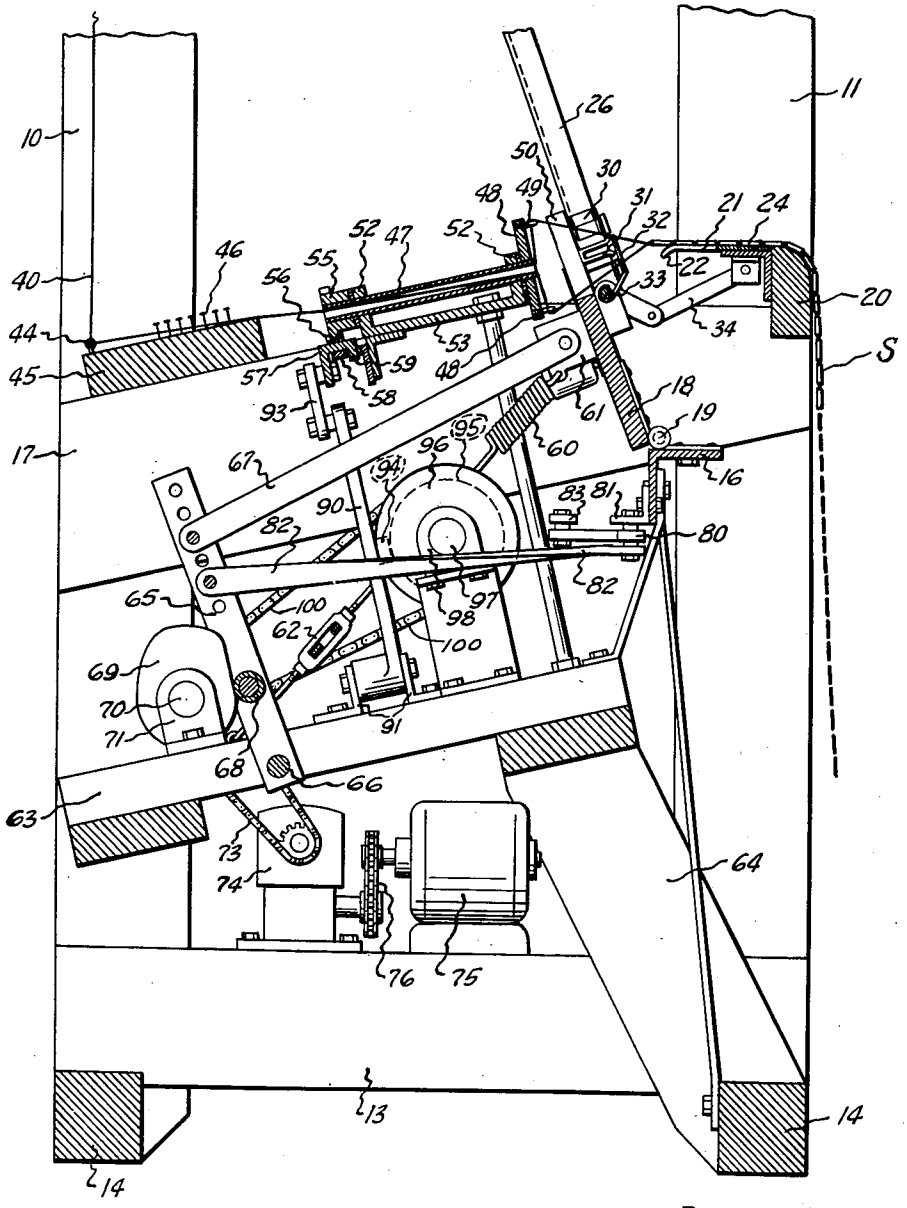


Fig. 3

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Aug. 30, 1949. F. R. CLARK 2,480,395

WEAVING MACHINE

Filed March 29, 1947 6 Sheets-Sheet 4

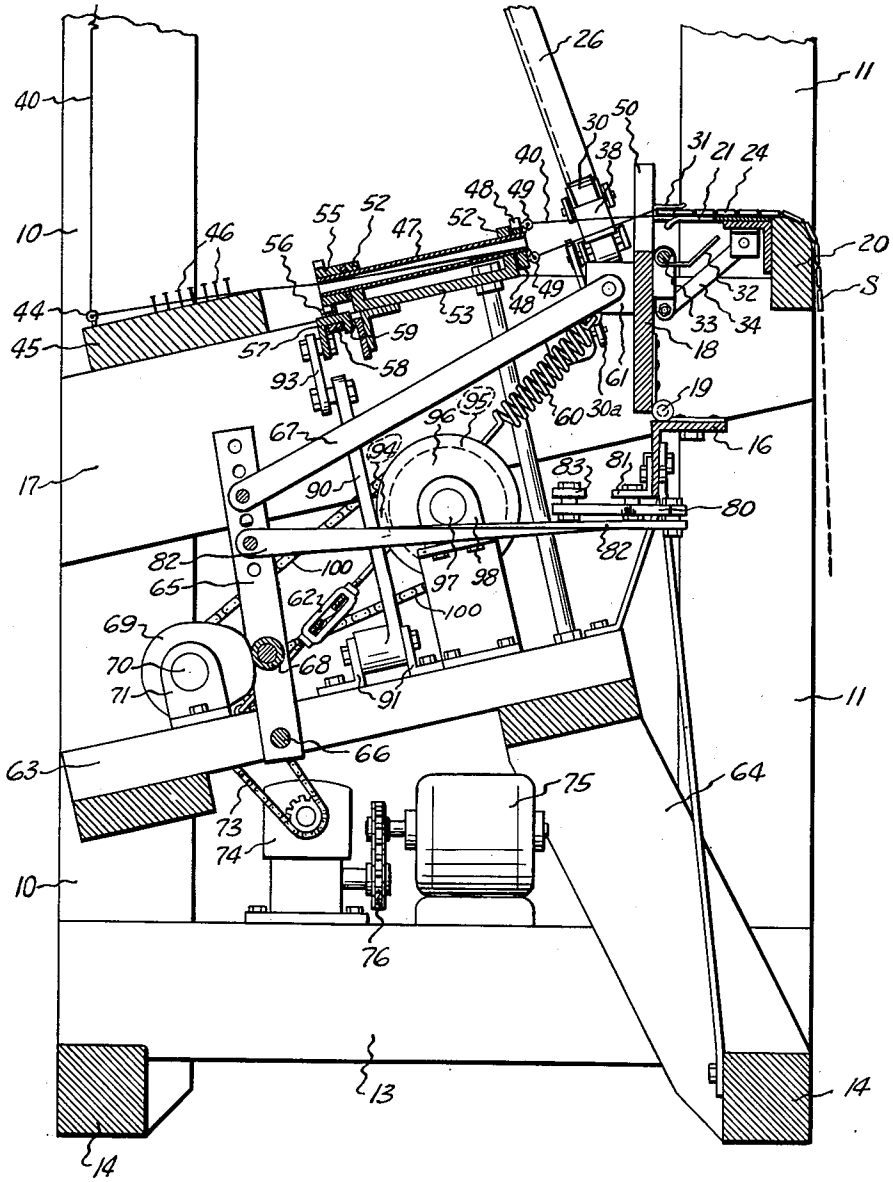


Fig. 4

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Aug. 30, 1949. F. R. CLARK 2,480,395

WEAVING MACHINE

Filed March 29, 1947 6 Sheets-Sheet 5

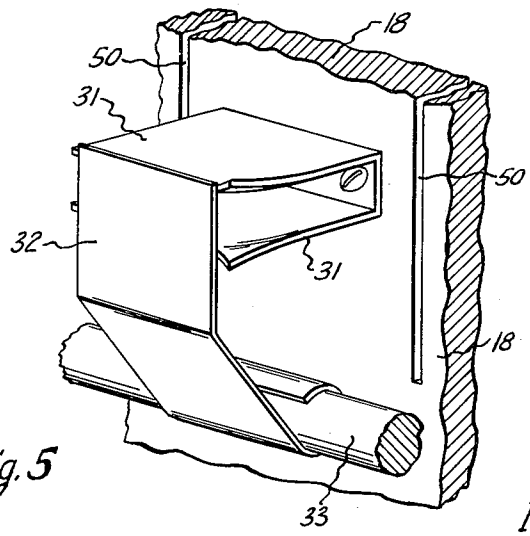


Fig. 5

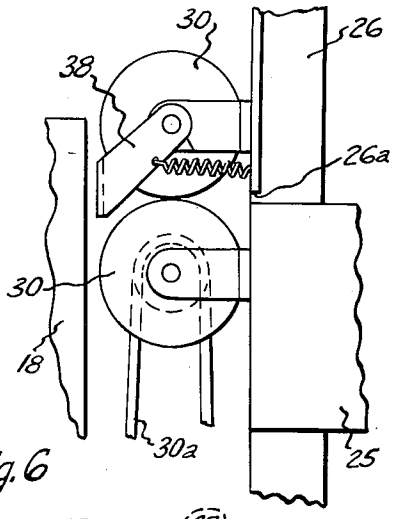


Fig. 6

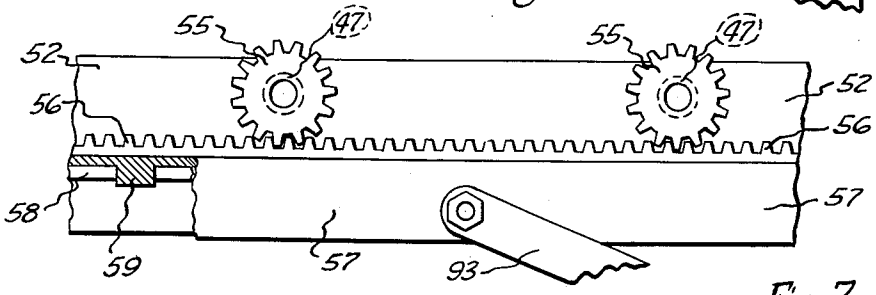


Fig. 7

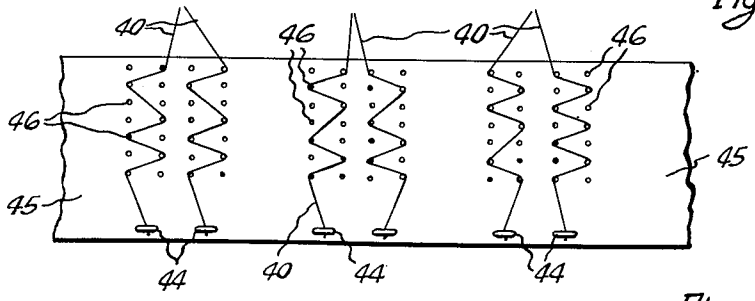


Fig. 8

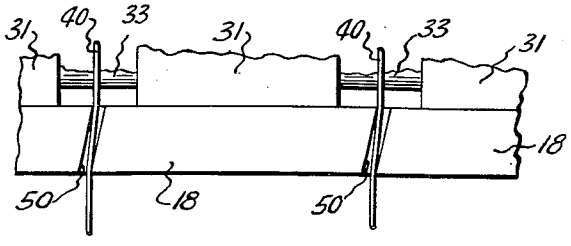


Fig. 9

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WEAVING MACHINE

Filed March 29, 1947 6 Sheets-Sheet 6

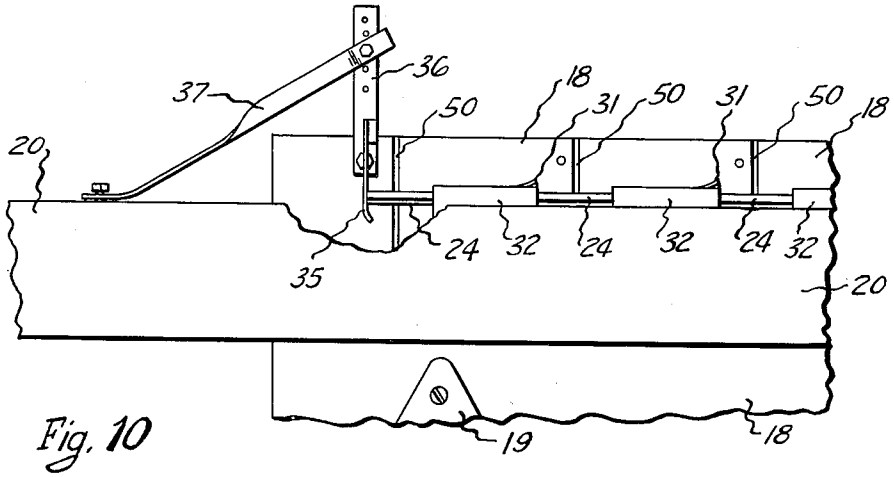


Fig. 10

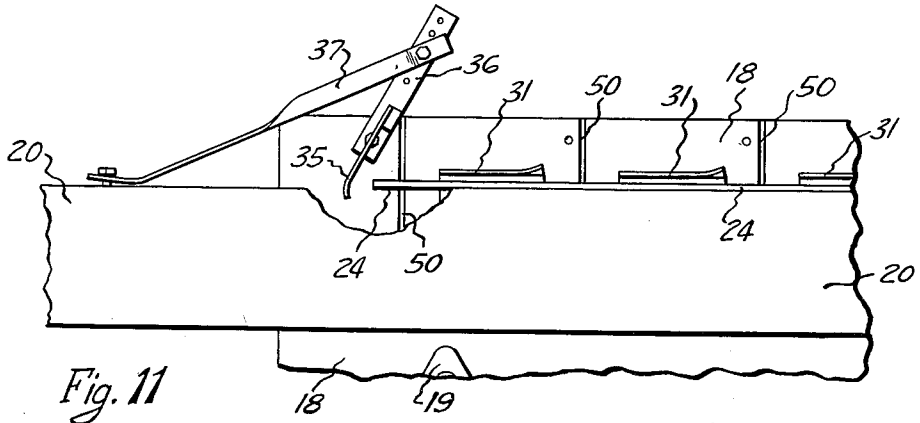


Fig. 11

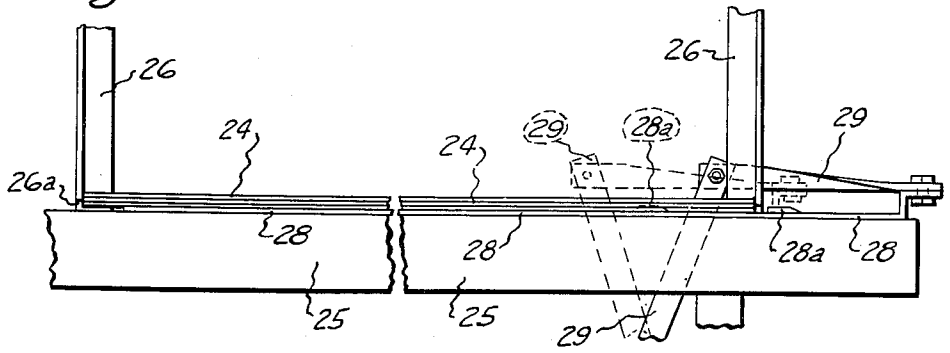


Fig. 12

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Patented Aug. 30, 1949

2,480,395

UNITED STATES PATENT OFFICE

2,480,395

WEAVING MACHINE

Frank R. Clark, Dallas, Tex., assignor to Ventilated Porch Shade Company, Dallas, Tex., a corporation of Texas

Application March 29, 1947, Serial No. 738,104

16 Claims. (Cl. 139—11)

1

This invention relates to new and useful improvements in weaving machines, and more particularly to machines for weaving or lacing together wood or metal slats by means of warp cords or wires to produce a flexible slatted material especially suitable for use as a shade, blind or screen, or slatted fencing.

One object of the invention is to provide a weaving machine, of the character described, which is arranged to weave or lace together thin slats of wood or metal of definite length to form woven slatted material in a continuous elongate strip, which strip may subsequently be cut into sections of desired length to form blinds, shades or the like.

An important object of the invention is to provide, in a weaving machine of the character described, swingable gate or lay means having novel guide means thereon for receiving and holding slats in a desired proper position while said slats are beat up between the warp cords or wires.

Another object of the invention is to provide, in a weaving machine of the character described, an improved shed forming mechanism and operating means therefor, whereby the warp cords or wires are delivered from the shed forming mechanism without twisting, and are held taut to facilitate interposing of the individual slats therebetween.

A further object is to provide, in a weaving machine of the character described, means for holding the woven slat material taut and the warp cords or wires under tension, as the material progresses from the machine, whereby the finished woven material is delivered in proper condition for use and the slats are tightly bound and prevented from sliding from between the warp cords or wires.

Still another object of the invention is to provide a weaving machine of the character described which is readily adaptable for the manufacture of flexible slatted material of different widths, having adjustable stop means on the swingable gate or lay member for correctly positioning the slat members with respect to the warp cords or wires to obtain woven slatted material of different desired widths; said stop means also being arranged to swing away from the ends of the slats as they are beat up in the warp cords and as the gate swings away from the beat up slats, whereby the ends of the slats are positioned in alignment with all other slats in the woven material and trimming of the ends of the slats in the woven material to obtain uniform edges is not necessary.

A still further object of the invention is to provide, in a weaving machine of the character described, an improved slat feeding mechanism for rapidly and positively introducing individual slats into the shed between the warp cords or wire, and wherein the rapid feeding means is ineffective until a slat is started toward the warp cords or wires by push means operated in coaction with and controlled by the movement of the gate or lay member, whereby the slat cannot be fed into the shed until the gate member is in proper receiving position.

2

Yet another object of the invention is to provide, in a feeding mechanism of the character described, means for supporting the slat and reducing friction resisting movement of the slat as the slat is initially moved from the slat stack toward the lay member, said means also including a push member which is adjustable whereby slats of different lengths may be fed by the mechanism.

Additional objects and advantages of the invention will readily be apparent from the reading of the following description of a device constructed in accordance with the invention, and reference to the accompanying drawings thereof, wherein:

Figure 1 is a side elevation of a slat weaving machine constructed in accordance with the invention,

Figure 2 is a front view of the weaving machine, taken on the line 2—2 of Figure 1,

Figure 3 is an enlarged transverse vertical sectional view of the weaving mechanism showing the swingable gate or lay member in open or slat receiving position.

Figure 4 is a view similar to Figure 3, showing the swingable gate or lay member in closed or slat tying position,

Figure 5 is an enlarged fragmentary view showing details of the slat guide of the gate or lay member,

Figure 6 is an enlarged view of the slat feeding rollers and stop gate,

Figure 7 is an enlarged fragmentary rear elevation of the operating means for the shed forming mechanism,

Figure 8 is a plan view of a portion of the tensioning board and pins,

Figure 9 is an enlarged edge view of the upper end of the gate member,

Figures 10 and 11 are enlarged fragmentary views of the adjustable slat stop means on the swingable gate, showing the stop member in slat stopping and disengaged positions, and

Figure 12 is an enlarged front elevation of the slat rack and push means.

In the drawings, the weaving machine itself is

designated generally by the letter M, and an accumulator mechanism for maintaining tension upon the woven slat material, which is carried by a stapler's work table T, is indicated generally by the letter A. A walk-way W for the machine operator is provided between the weaving machine and the accumulator.

The weaving machine includes a frame having at its corners a pair of rear uprights or vertical support members 10 and a pair of front uprights or vertical support members 11, and having upper horizontal cross members 12 at its top and lower horizontal cross members 13 at its bottom, connecting the uprights. The frame is mounted on a pair of spaced longitudinally extending foot or base members 14, and is provided with upper longtudinal frame members 15 at its top.

An elongate gate supporting member 16, extending between the front uprights 11 of the frame, is secured at each end to the under side of angularly disposed central cross members 17 located at each end of the frame. A gate or lay member 18 is swingably mounted on the support 16 by means of hinges 19, and is adapted to swing toward and from a breast beam 20 carried by the front uprights 11. The breast beam has a plurality of spaced rearwardly extending fingers 21, each formed with a down-turned lip 22 at its rear end, for receiving and supporting the woven slat material S.

A plurality of elongate thin flat slats 24, of wood or metal, are stacked one above the other in a slat rack 25, having angle members 2 at each end and upwardly directed intermediate side stays 27 for maintaining the slats in stacked position on the rack. The bottom slat of the stack rests upon an elongate sliding shoe or push member 28, operated by a lever mechanism 29 in a manner which will hereinafter be described. An upstanding push lug 28a, of a height slightly less than the thickness of the slat, is removably secured to the upper surface of the slidable push member, and this lug engages the outer end of the lowermost slat to push it out from under the stack and toward the gate or lay member when the push member is actuated by the lever mechanism. The slat is supported on the elongate push member or shoe and moves with the shoe as it is moved to push the slat from beneath the stack. The frictional resistance to movement of the slat due to the weight of the superposed slats is manifestly materially reduced, since the slat slidingly engages only the slat next above it and the frictional resistance acts upon only the upper side of the moving slat. By moving with the slat, the shoe or push member also substantially eliminates bending or breaking of the slat as it is pushed from the bottom of the stack. The push lug 28a may be releasably secured at different positions along the elongate push member to provide for feeding slats of different desired lengths to the weaving machine, whereby slatted material of different desired widths may be woven therein.

The slat so ejected from the stack toward the weaving machine passes through a slot 26a formed in the angle member 26 nearest the weaving machine and is moved by the push member until the end of the slat engages between a pair of power-driven drive wheels or feed rollers 30, preferably formed of rubber or other resilient material, which feed the slat into a series of spaced guide or holder members 31 carried by or positioned on the face of the swingable gate or lay member 18. The feed rollers are turned rapidly by a separate motor connected by a belt 30a with one of the roller shafts and, therefore, the slat is fed rapidly into the guide members once it has been pushed between the feed rollers by the push member 28.

It will be noted that, though the feed rollers are constantly turning, they are ineffective and cannot move the slat until it is pushed between the rollers by the push member; and that the push member is actuated in coaction with the gate member, as will hereinafter be described, whereby the slat cannot be fed into the guide members until they and the gate member are in proper receiving position.

The spaced guide members 31 are preferably substantially U-shaped and have their base or bottom cross portion secured to the face of the gate member, as clearly shown in Figure 5. The arms of the guide members are spaced a sufficient distance apart to readily receive slats of slightly different thicknesses, but are sufficiently close together to hold the slats in a substantially horizontal position as they are beat up between the warp cords or wires. The arms of the guide members are flared slightly on the side which the slat first enters, to facilitate entry of the slat between the arms without catching on said arms.

The slats are retained in the guide members 31 by means of a series of spaced swingable covers or closures 32, which are supported on a shaft 33 and are adapted to close or cover the open end or mouth of each of the guide members when the gate is in the open position shown in Figure 3. A linkage 34, connected with the shaft 33 and the rear of the breast beam 20, turns the shaft 33 to swing the cover members 32 away from the guide members when the gate member is swung to the closed beating up position shown in Figure 4, whereby the slats may move out of the guide members. The linkage also positively returns the covers to slat retaining position when the gate member is swung to the open slat receiving position shown in Figure 3.

An elongate flat spring stop member 35 has its upper end secured to an elongate swinging arm 36, which is pivotally secured at its lower end to the face of the gate member near its upper edge. An elongate actuating link 37 has one end swingably connected to the upper portion of the swinging arm 36, and its other end swingably secured to the upper surface of the breast beam 20, whereby when the gate member is swung toward the breast beam the link causes the arm 36 to swing and, in turn, to swing the depending lower end of the stop member 35. With the gate member in open slat receiving position, the stop member extends substantially vertically with its lower end in alignment with the guide members 31, whereby the end of the slat forced through the guide members by the drive wheels 30 engages the stop member and the slat is stopped and held with its end in alignment with the ends of the already woven slats.

A stop gate 38 is swingably mounted on the shaft of the upper drive wheel and is adapted to swing downwardly behind the rear end of the slat, after it is ejected from between the drive wheels, to prevent movement of the slat back toward the rack. Thus, by means of the stop member 35 and stop gate 38, the slat is properly positioned in alignment with the edges of the already woven slat material.

When the gate member is swung toward the breast beam, the lower end of the stop member 35 is swung outwardly away from the end of the

slat by the action of the link 37 and swinging arm 36, whereby the stop member does not engage the slat when the gate is in such closed position. Thus, the stop member does not drag against the end of the slat to move the slat out of its proper woven position when the gate member swings back to the open position. Therefore, the marginal edge of the woven material is maintained in a true line, and trimming the woven material to obtain an even edge is not necessary.

The adjustable stop 35 and its operating parts may be moved to any desired position on the face of the gate member 18, to stop and to position slats of different lengths, whereby slat material of different widths may be woven in the same machine.

A plurality of lengths of cord or wire 40, from a plurality of rolls or spools 41 carried on longitudinally extending horizontal shafts 42 in the upper portion of the frame, are directed through upper guide eyes 43, carried by the upper longitudinal frame members 15, to the rear of the frame, and thence downwardly to lower guide eyes 44 secured on the upper surface of a longitudinally extending tensioning board 45. From the lower guide eyes 44 the cords or wires pass between a plurality of tautening or tensioning pins 46 and, in pairs, through elongate tubular quills 47, each having on its forward end diametrically opposed arms 48 with reversing eyelets 49 at their outer ends. One of the cords or wires of the pair extending through the quill is threaded through each of the reversing eyelets 49.

From the reversing eyelets 49 the cords or wires are directed through substantially vertical slits 50 formed in the upper portion of the gate member between each guide member 31, and one length of cord or wire extends over the slat positioned in the guide members and the other length extends under such slat. The shed between the cords or wires, formed by the provision of the spaced reversing eyelets 49 on the arms 48 of the quill members, permits the slat to readily slide between the two lengths of cord or wire into position in the guide members on the face of the gate member.

The elongate tubular quills 47 are journaled in the upright flanges 52 of a channel member 53 secured on the upper edges of the central cross members 17, and a gear pinion 55 is secured to the rear end of each tubular quill and engages an elongate gear rack 56 formed on the upper surface of an angle member 57. The angle member 57 is slidable upon a rearwardly extending flange 58 carried by the channel member, and a plurality of lugs 59, formed on the under side of the angle member, engage in a slot formed in the flange 58 to hold the angle member against displacement from the flange. Thus, as the angle member, and the gear rack 56 carried thereby, are moved longitudinally of the flange, the gear pinions are rotated and, in turn, cause the quills 47 to turn, whereby the arms 48 at the inner ends of the quills are likewise swung to reverse the positions of the arms. When the positions of the arms 48 are reversed, the length of cord or wire 40 which was below the slat 24 is moved upwardly, while the cord which was above the slat is moved downwardly, whereby the slat is laced or woven between the plurality of pairs of cords or wires.

It will be seen, therefore, that the slats, which are slid into the series of guide members 31 with

the gate or lay member 18 in the position illustrated in Figure 3, are beaten up or forced against or into close proximity with the last woven slat member in the woven material S when the gate member is moved to the closed vertical position illustrated in Figure 4. The beaten up slat is held substantially horizontal with its edge adjacent the edge of the last woven slat by the guide members 31 and the quills 47 are then turned, in the manner just described, to reverse the positions of the cords or wires, whereby the slats are laced or woven between the cords or wires and are held securely in place in the woven material S. The gate or lay member 18 then returns to the open position illustrated in Figure 3, whereupon another slat may be fed into the guide members 31 and the process repeated.

The gate or lay member 18 is normally urged toward the open position, illustrated in Figure 3, by means of a helical tension spring 60 connected at one end to a rearwardly extending lug 61 provided on the rear surface of the gate member. The opposite end of the spring is connected through a turnbuckle 62 to the upper surface of a platform 63, supported on legs 64 within the frame below the angularly disposed central cross members 17. The force exerted by the spring may be controlled by adjustment of the turnbuckle.

For positively moving the gate member from the open position to the closed position, a crank lever 65 is swingably connected at its lower end to a shaft 66 carried by the platform 63. One end of a pitman rod 67 is connected to the upper end of the crank lever, and the other end of the pitman rod is connected to the lug 61 at the rear of the gate, whereby, when the crank lever is swung, the gate member is also swung from open to closed position and back.

A roller follower 68, carried by the lever 65, is engaged by a cam member 69 fixed on a shaft 70 mounted in journals 71 on the table 63. A sprocket wheel 72 secured on the end of the shaft is drivably connected by a chain 73 with a speed reducer 74, which is in turn driven by a motor 75 connected with said speed reducer by a chain 76. Therefore, when the cam 69 is turned by the shaft 70, its cam face will engage the roller follower 68 and move the crank lever 65, swinging the same about the pin 66 and acting through the pitman 67 to swing the gate member 18 from the open position of Figure 3 to the closed position of Figure 4 and return.

A bell crank 80, connected at its center on a vertical shaft carried by an angle member 81 at the lower end of the elongate supporting member 16, has one arm connected by means of a link member 82 with the crank lever 65, whereby movement of the crank lever causes a corresponding movement of the bell crank 80. The other arm of the bell crank is pivotally connected to an elongate horizontal rod 83, which has its other end connected to the lower end of the lever mechanism 29, whereby the push member 28 is actuated by movement of the crank lever 65.

When the crank lever is swung toward the front of the weaving machine to move the gate member 18 toward the closed position, the link member 82 swings the bell crank 80 to pull the rod 83 and the lower end of the lever mechanism 29 toward the weaving machine. This causes the upper end of the lever mechanism to move away from the weaving machine, whereby the push lug 28a on the push member is moved outwardly be-

yond the end of the lowermost slat 24 in the rack 25. Then, when the crank lever 65 returns to the position shown in Figure 3, returning the gate or lay member 18 to the open position, the bell crank 80 and rod 83 swing the lower end of the lever mechanism 29 outwardly, whereby the upper end of the lever mechanism is moved toward the weaving machine and the push lug on the push member 28 forces the lowermost slat toward the weaving machine and into engagement between the drive wheels or feed rollers 30. The drive wheels then rapidly force the slat through the series of spaced guide members 31 on the face of the gate 18 and between the warp cords or wires 40. Since the push member is moved only in positive coaction with the gate member, the slat cannot be fed into place in the guide members on the gate member until said gate member is in proper receiving position.

For causing longitudinal movement of the angle member 57 and the gear rack 56 carried thereby, to cause the quills 47 to turn through an arc of approximately 180 degrees to reverse the positions of the cords or wires carried by the reversing eyelets 49 at the ends of the arms 48 on the inner ends of said quills, an elongate crank arm 90 has its lower end pivotally secured between upstanding lugs 91 carried on the upper surface of the table 63, and has its upper end connected by a link 93 to the angle member. A cylindrical follower stub or boss 94 is provided substantially centrally of the crank arm 90 and engages in a peripheral cam groove 95 formed in a cylindrical cam member 96. The cylindrical cam member is fixed on a shaft 97 mounted in journals 98 secured to the top of the table 63. A gear sprocket 99 is fixed on the outer end of the shaft 97 and connected by means of a chain 100 to a driving sprocket 101 mounted on the shaft 70, whereby the motor 75 also drives the cam member 96. The groove in the cam member extends for approximately 180 degrees or half the circumference of the cam member in a plane near one end of the cylindrical cam member, and the balance of the groove, approximately 180 degrees or half the circumference, lies in a plane adjacent the other end of the cam member, the two half circumference groove portions being connected, whereby the follower boss 94 will be readily moved from one portion to the other portion of the groove as the cam member revolves. The sizes of the gear sprocket 99 and the driving sprocket 101 are such that the shaft 97 on which the cam member 96 is mounted is driven at half the speed at which the shaft 70 is turned, so that the cam member is turned through one revolution for each two revolutions of the shaft 70. Thus, the shed forming arms 48 are reversed in position once for each revolution of the shaft 70 and each beating up movement of the lay member 18.

It will be seen, therefore, that, when the cam member 96 is revolved by the shaft 97, the engagement of the follower boss 94 in the groove 95 will swing the upper end of the crank arm 90 in an arc, whereby the link 93 will cause longitudinal movement of the angle member 57 and the rack gear 56 carried thereby. The cam groove shape is such that the movement of the crank arm 90 is sufficient to cause the rack gear 56 to move a distance which will turn the pinion gear 55 through approximately 180 degrees, whereby the eyelets 49 in the ends of the arms 48 on the quill members will be reversed in position. Therefore, when the pin moves from one portion of the cam slot to the other, the gear rack 56 is moved a sufficient distance to turn the quill arms through an arc of approximately 180 degrees, and, when the pin or stub moves back into the first portion of the cam groove, the crank arm 90 will be swung back through the same arc to move the rack gear in the opposite direction a sufficient distance to turn the arms back to their original positions.

It will thus be seen that the quill arms are turned through approximately 180 degrees to reverse their positions, then are turned back, in a direction opposite to the original motion, to their original positions, whereby the lengths of cord or wire extending through the quill are woven or laced around the slats 24. Furthermore, the cords or wires are not twisted together, since they are turned through an arc of only approximately 180 degrees and are then turned back in the opposite direction to their original position. Obviously, even though the arms were turned through a greater arc the cords or wires would not be twisted together, since the arms are then turned back in the opposite direction to their original position.

The warp cords or wires, fed from the rolls or spools in the upper portion of the weaving machine, pass through the tensioning pins 46 carried by the tensioning board 45, and the tensioning pins create a frictional drag on the individual lengths of warp cord to resist movement of the cords toward the breast beam. As will clearly be seen in Figure 8, the warp cords or wires are threaded in a zig-zag fashion over a plurality of adjacent tensioning pins, whereby the engagement of the cord of wire with the pins creates the frictional drag. Threading the cord or wire about more or fewer tensioning pins will increase or decrease the frictional drag, and thus also permit equalizing the tension applied to each of the lengths of cord or wire. By threading the cords or wires about the tensioning pins, a sufficient frictional drag is created to resist movement of the cords toward the breast beam to assure that the shed formed between the lengths of cords or wire by the reversing eyes 49 remains sufficiently open to permit the slats to be fed readily therebetween through the guide members 31 on the swingable gate. This tautening or tensioning of the warp cords or wires also maintains the woven slatted material S in tightly woven condition, and provides a more desirable finished product.

Further, the slits 50 in the upper portion of the gate member 18 are disposed at an angle with respect to the face of the gate member, as best shown in Figure 9, whereby the warp cords or wires engage one side wall of the slits at the face of the gate member and engage the opposite side wall of the slits at the back of the gate member. Both cords or wires engage against the forward edge of one side wall, whereby both warp cords are normally maintained in alignment in a substantially vertical plane and are held closely and positively together at the cross-over at the rear edge of the slats 24, thus positively and tightly binding or lacing each slat in the woven material. The width of the slits is adequate to permit the warp cords or wire to pass each other readily as they are reversed in position, and to permit knots or ties in the warp cord to pass readily therethrough. However, the angle at which the slits are formed in the gate member assures that each warp cord or wire will engage and frictionally drag against the edges of the

opposite walls of the slits when the shed is formed, whereby such cords or wires are positively aligned in a substantially vertical plane to facilitate entry of slats between the cords or wires and to assure that the woven slats are positively and tightly bound or laced together.

The slits 50 are also so formed in the gate member that they extend downwardly between adjacent guide members 31, whereby the warp cords or wires travel in a substantially vertical plane or line between the guide members as such warp cords or wires are reversed in position. This permits the guide members to be positioned more closely together than would be possible if the slits were not provided, because the slits limit the lateral displacement of the warp cords or wires as they are reversed in position.

The woven slatted material S is intermittently fed outwardly over the fingers 21, as each new slat is added thereto, and passes over the front of the breast beam 20 and downwardly therefrom under a pair of idler rollers 105, located beneath each side of the operator's walk-way W, and is then directed upwardly over a floating accumulator roller 106, which is supported by cables 107 extending through pulleys 108 to a weight 109. From the accumulator roller, the woven slatted material is directed downwardly beneath a pressure roller 110 and upwardly from said pressure roller 110 over and around a drive roller 111, secured to the stapler's table T, and to the top surface of the table. The pressure roller 110 is mounted on one end of an elongate arm 113, and is urged toward engagement with the drive roller 111 by means of a coil spring 114 connected at one end to the arm 113 and at the other end to the table, whereby such pressure roller presses the woven slatted material securely against the drive roller. As the woven material increases in length, the accumulator 106 is lifted by the weight 109 to take up the additional length.

The drive roller 111 is turned by the operator when it is desired to feed a portion of the woven slatted material onto the table T to be cut off and used for making shades or the like. As the material S is fed onto the table by the drive roller, it is pulled downwardly from over the accumulator roller 106, causing the accumulator roller to move toward the table. The engagement of the pressure roller 110 and the drive roller 111 with the woven material pressed therebetween prevents the woven material from moving back from the drive roller over the accumulator roller to the weaving machine, and the accumulator roller maintains a constant tension upon the length of woven slatted material delivered from the weaving machine.

In making shades or blinds from the woven slatted material S, a sufficient length of the woven material is fed onto the table T by the drive roller, and each of the warp cords or wires is stapled to the slats on each side on the interstice at which the warp cords or wires are to be cut to part the desired section of the woven material from the main body thereof. The warp cords or wires are then cut and the ends thereof are securely clamped between the end slat and a reinforcing strip (not shown) stapled or nailed to each side of the end slat. Thus, a slatted woven blind or shade portion is provided, which may be readily rolled upon itself from one end in the customary manner.

Manifestly, by using slightly thicker and wider slats and by using metallic wire warp material, slatted fence material may be woven in the machine, if desired. In such event, the reversing eyelets 49 may be turned through an arc of approximately 360 degrees or more to firmly tie each slat in place between the warp wires, and then may be turned back in the opposite direction through the same number of degrees to form the next successive shed.

From the foregoing, it will be seen that an improved weaving machine has been provided which is particularly adapted for weaving or lacing together wood or metal slats by means of warp cords or wire to produce a flexible slatted material especially suitable for use as a shade, blind or screen material, or slatted fence material; that the machine is arranged to weave or lace the slats into a continuous elongate strip of woven slatted material of a definite width, which strip may subsequently be cut into sections of desired length to form such blinds, shades or the like. It will particularly be noted that the weaving machine is provided with an improved swingable gate or lay member having novel guide means thereon for receiving and supporting slats in a desired proper position while the slats are beat up between the warp cords or wires. Further, an improved shed forming mechanism and operating means therefor has been provided in the weaving machine, whereby the warp cords or wires are delivered through the shed forming mechanism without material twisting, and are held taut in proper position to facilitate interposing of the individual slats therebetween to form the woven slatted material. It will also be seen that the weaving machine is so designed that the warp cords or wires are constantly held in tension as the material progresses from the machine, whereby the slats are tightly bound and prevented from sliding between the warp cords or wires and the finished woven material is delivered in proper condition for use. It will further be seein that the weaving machine is particularly adapted for adjustment to permit manufacture of flexible slatted material of different widths, having stop means adjustable on the swingable gate or lay member for correctly positioning slat members with respect to the warp cords or wires to obtain woven material of the desired width; and that the stop member is swung away from the end of the slats as they are beat up between the warp cords, whereby the stop member does not drag across the end of the slats to pull the slats out of position when the lay member returns to open position. An improved slat feed mechanism has also been provided, which includes continuously running feed rollers adapted to rapidly move the slats into position in the guide means on the gate member, but wherein the feed rollers act on the slat only when such slats are fed between the rollers by a push member which is activated in coaction with the gate member, whereby slats are fed only when said gate member is in proper receiving position. Furthermore, the slat push member supports and moves with the slat being fed, whereby frictional resistance to movement of the slat is reduced, and bending or breaking of the slat is substantially eliminated.

It will also be noted that the angle members 26, forming the upright supports of the slat rack, are disposed at a rearwardly inclined angle substantially equal to the angle which the gate member 18 assumes in the open slat receiving position, whereby slats from the rack are fed into the guide members 31 at the same angle as that at which the guide members are positioned, and the slats will readily enter the guide members. Also,

due to the inclination of the angle members, the slats lean against and are supported by the inwardly extending arms of the angle members, whereby they may be readily positioned and supported on the rack without the necessity of providing front retaining means.

The foregoing description of the invention is explanatory only, and changes in the details of the construction illustrated may be made by those skilled in the art, within the scope of the appended claims, without departing from the spirit of the invention.

What I claim and desire to secure by Letters Patent is:

1. A weaving machine for weaving flat slats with flexible warp cords and including, a slat rack, a lay member having a plurality of spaced normally closed openable substantially rectangular guide means located in substantial horizontal alignment with the bottom of the slat rack, means for feeding the lowermost slat in the rack from said rack into said guide means, a plurality of warp cord shed forming means, means for directing a plurality of warp cords to the shed forming means, means for reversing the position of the warp cords whereby the slat is held between the warp cords, means for opening said guide means to permit the slat to move laterally therefrom, and means for moving the lay member for beating up successive slats closely adjacent a previously woven slat to form a flexible woven slatted material.

2. A weaving machine including, a breast member, a gate member swingable toward and from the breast member, a series of spaced aligned guide members carried by the gate member and adapted to receive a slat therein and having open sides by means of which the slat may be moved laterally from the guide members, covers for the open sides of the guide members normally closed to retain the slat in the guide members, warp material shed forming means for spreading a plurality of pairs of warp material whereby a slat may be fed into the guide members between the separated strands of warp material, means for swinging the gate toward the breast member to beat up the slat in the warp material, the covers for the guide members moving to open position when the gate member moves toward the breast member to permit the slat to move out of the guide members, means for reversing the positions of the separated strands of warp material to bind the slat therebetween, and means for feeding successive slats into said guide members.

3. A weaving machine including, a breast member, a gate member swingable toward and from the breast member, a series of spaced aligned guide members carried on the gate member and adapted to receive a slat therein and having an open mouth whereby the slat member may be removed laterally from the guide members, covers for the open mouth of the guide members normally closed to retain the slat in the guide members, a plurality of warp material shed forming means positioned in substantial alignment with the breast member and the guide members of the gate member and adapted to spread a plurality of pairs of strands of warp material, whereby the slat fed into the guide members will pass between the separated strands of warp material, a slat rack having its bottom located in substantially longitudinal horizontal alignment with the series of guide members when the gate member is in open slat receiving position, feed means for moving the lowermost slat from the rack and into the guide members on the gate member, means for swinging the gate toward the breast member to beat up the slat in the warp material, means automatically moving the cover for the guide members to open position when the gate member moves toward the breast member whereby the slat may move out of the guide members, and means for reversing the positions of the separated strands of warp material to bind the slat therebetween.

4. In a weaving machine, a feeding mechanism for feeding successive slats from a slat rack to a lay member and including, push means for initially starting a selected slat from the rack toward the lay member, and rapid drive means engaging the slat after its initial movement for rapidly feeding the slat onto the lay member.

5. In a weaving machine, of the character described, a slat feeding mechanism including, a slat rack adapted to have a plurality of slats stacked thereon one above the other, a push member carried by the rack and arranged to engage the lowermost slat of the stack to impart an initial movement of the slat toward the lay member of the weaving machine, and rapid feed means adapted to engage the slat after its initial movement has been commenced by the push member and feed the slat rapidly onto the lay member.

6. In a weaving machine, a slat feeding mechanism including, a slat rack adapted to have a plurality of flat slats stacked thereon one above the other, push means for selectively engaging the lowermost slat of the stack and initially moving said slat toward the lay member of the weaving machine, rapid feed means adapted to engage the slat after its initial movement has been commenced by the push member and to rapidly feed the slat onto the lay member, the slat being ejected from such rapid feed means onto the lay member, and a stop gate for preventing return movement of the slat toward the rack.

7. In a weaving machine, a slat receiving guide member adapted to be mounted on the lay member of the weaving machine for receiving and holding a slat as the same is beat up between the warp material and formed in substantially a U-shape and having its bottom cross portion secured to the lay member, the arms of the U-shaped guide member being substantially parallel and spaced apart a distance sufficient to receive a slat therebetween but being sufficiently close together to limit turning movement of the slat therebetween when the slat is beat up in the warp material.

8. In a weaving machine, a slat receiving guide member adapted to be mounted on the lay member of the weaving machine for receiving and holding a slat as the same is beat up between the warp material and formed in substantially a U-shape and having its bottom cross portion secured to the lay member, the arms of the U-shaped guide member being substantially parallel and spaced apart a distance sufficient to receive a slat therebetween but being sufficiently close together to limit turning movement of the slat therebetween when the slat is beat up in the warp material, and a cover for the open end of the U-shaped guide member normally closing said open end to positively retain the slat in the guide member and movable away from the guide member to permit the slat to leave the guide member after said slat has been beat up and bound in the warp material.

9. In a weaving machine, a lay member having

a series of spaced slat receiving guide members mounted thereon for receiving and holding a slat as the same is beat up between the warp material, said guid. members each being formed in substantially a U-shape and having its bottom cross portion secured to the lay member, the arms of the U-shaped guide member being substantially parallel and spaced apart a distance sufficient to receive the slat therebetween but being sufficiently close together to limit turning movement of the slat in the guide member when the slat is beat up in the warp material, the lay member having a plurality of elongate warp material guide slits formed therein between adjacent slat guide members for guiding the warp material as the shed is reversed to bind the slat in the warp material.

10. In a weaving machine, a warp material shed forming mechanism including, an elongate tubular sleeve mounted to be rotatable about its longitudinal axis and having its forward end in substantial horizontal alignment with the breast member of the weaving machine, a pair of opposed radially extending arms on the forward end of the sleeve, a reversing eyelet at the outer end of each arm, the warp material strands being adapted to extend through the bore of the tubular sleeve from the rear end thereof to the forward end of the sleeve and in separate strands through the eyelets to the breast member of the weaving machine, the spaced eyelets separating the strands of warp material to form the shed, and means for turning the sleeve on its longitudinal axis, whereby the arms on the forward end of the sleeve are swung to reverse their position, thus reversing the position of the strands of warp material in the shed for binding the woof material therebetween, the means for turning the sleeve being arranged to turn the sleeve first substantially 180 degrees in one direction to bind one length of woof material between the strands of warp material and then through substantially 180 degrees in the opposite direction to bind a successive length of woof material between the strands of warp material whereby the strands of warp material at the rear end of the sleeve and extending therethrough are not twisted.

11. In a weaving machine, a lay member having a series of spaced slat receiving guide members mounted thereon for receiving and holding a slat as the same is beat up between the warp material, said guide members each being formed in substantially a U-shape and having its bottom cross portions secured to the lay member, the arms of the U-shaped guide member being substantially parallel and spaced apart a distance sufficient to receive the slat therebetween but being sufficiently close together to limit turning movement of the slat in the guide member when the slat is beat up in the warp material, the lay member being swingable from slat receiving open position toward the weaving machine breast member, a slat rack adapted to have a plurality of slats stacked thereon one above the other, the bottom of the rack extending in longitudinal alignment with the series of guide members on the lay member when the lay member is in open slat receiving position, a push member carried by the rack and arranged to engage the lowermost slat of the stack to impart an initial movement of the slat toward the guide members, and rapid feed means adapted to engage the slat after its initial movement has been commenced by the push member and to feed the slat rapidly into the series of guide members.

12. In a weaving machine, a lay member having a series of spaced slat receiving guide members mounted thereon for receiving and holding the slat as the same is beat up between the warp material, said guide members each being formed in substantially a U-shape and having its bottom cross portion secured to the lay member, the arms of the U-shaped guide members being substantially parallel and spaced apart a distance sufficient to receive the slat therebetween but being sufficiently close together to limit turning movement of the slat in the guide member when the slat is beat up in the warp material, the lay member being swingable toward and from the breast member of the weaving machine, a shed forming machanism formed of an elongate tubular sleeve mounted to be rotatable about its longitudinal axis with its forward end in substantial horizontal alignment with the guide members on the lay member and with the breast member of the weaving machine and having a pair of opposed radially extending arms on its forward end with a reversing eyelet at the outer end of each arm, the lay member having a plurality of elongate warp material guide slits formed therein between adjacent slat guide members and each in alignment with a shed forming mechanism, the warp material extending through the tubular sleeve of the shed forming mechanism from the rear end thereof to the forward end of the sleeve and in sparate strands through the eyelets and through the slits in the lay member to the breast member of the weaving machine, the spaced eyelets separating the strands of warp material to form the shed, and means for turning the sleeve of the shed forming machanism first in one direction and then in the opposite direction on its longitudinal axis, whereby the arms are swung to reverse their position, thus reversing the positions of the strands of warp material in the shed for binding the slats therebetween, the guide slits in the lay member guiding the warp material as the arms of the shed forming mechanism are swung to reverse the shed so that the strands of warp material are limited against lateral movement at the face of the lay member between the guide members, said slit also maintaining the separate strands of said warp material in position permitting a slat to be inserted therebetween into the guide members.

13. In a weaving machine, a slat feeding mechanism for feeding successive slats from a slat rack to a lay member and including, push means for initially starting a selected slat from the rack toward the lay member, rapid drive means engaging the slat after its initial movement has commenced for rapidly feeding the slat onto the lay member, and adjustable stop means on the lay member for stopping and positioning the slat in proper alignment on the lay member to be beat up and bound in warp material.

14. In a weaving machine, a lay member having a series of spaced slat receiving guide members mounted thereon for receiving and holding a slat as the same is beat up between warp material, the lay member having a plurality of elongate warp material guide slits formed therein between adjacent slat guide members for guiding the warp material as the shed is reversed to bind the slat in the warp material, the slits formed in the lay member extending at an angle to the front and back faces of said lay member, whereby the warp cords engage against the portion of the lay member forming one wall of the slit at the rear face and against the portion of

the lay member forming the opposite wall of the slit at the front face of the lay member and are guided by such wall portions.

15. In a weaving machine, a feeding mechanism for feeding successive slats from a slat rack to a lay member and including, an elongate push shoe member for supporting and initially moving a slat from the rack toward the lay member, the push shoe member moving with the slat during such initial movement, and rapid drive means engaging and acting on the slat after such initial movement has been commenced to rapidly feed the slat to the lay member.

16. In a weaving machine, a movable stop member for stopping slat woof material in position to be beat up and bound in warp material, and means for moving the stop member to a position in which said stop member is spaced from the slat as the slat is beat up, whereby the stop member is prevented from displacing the slat from its proper beat up woven position and the ends of successively woven slats are disposed in alignment.

FRANK R. CLARK.

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Certificate of Correction

Patent No. 2,480,395 August 30, 1949

FRANK R. CLARK

It is hereby certified that errors appear in the printed specification of the above numbered patent requiring correction as follows:

Column 3, line 17, for "longtudinal" read *longitudinal*; line 33, for "members 2" read *members 26*; column 10, line 40, for "seein" read *seen*; column 14, line 31, for "sparate" read *separate*;

and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 3rd day of January, A. D. 1950.

[SEAL]

THOMAS F. MURPHY,
Assistant Commissioner of Patents.