

Nov. 18, 1924.

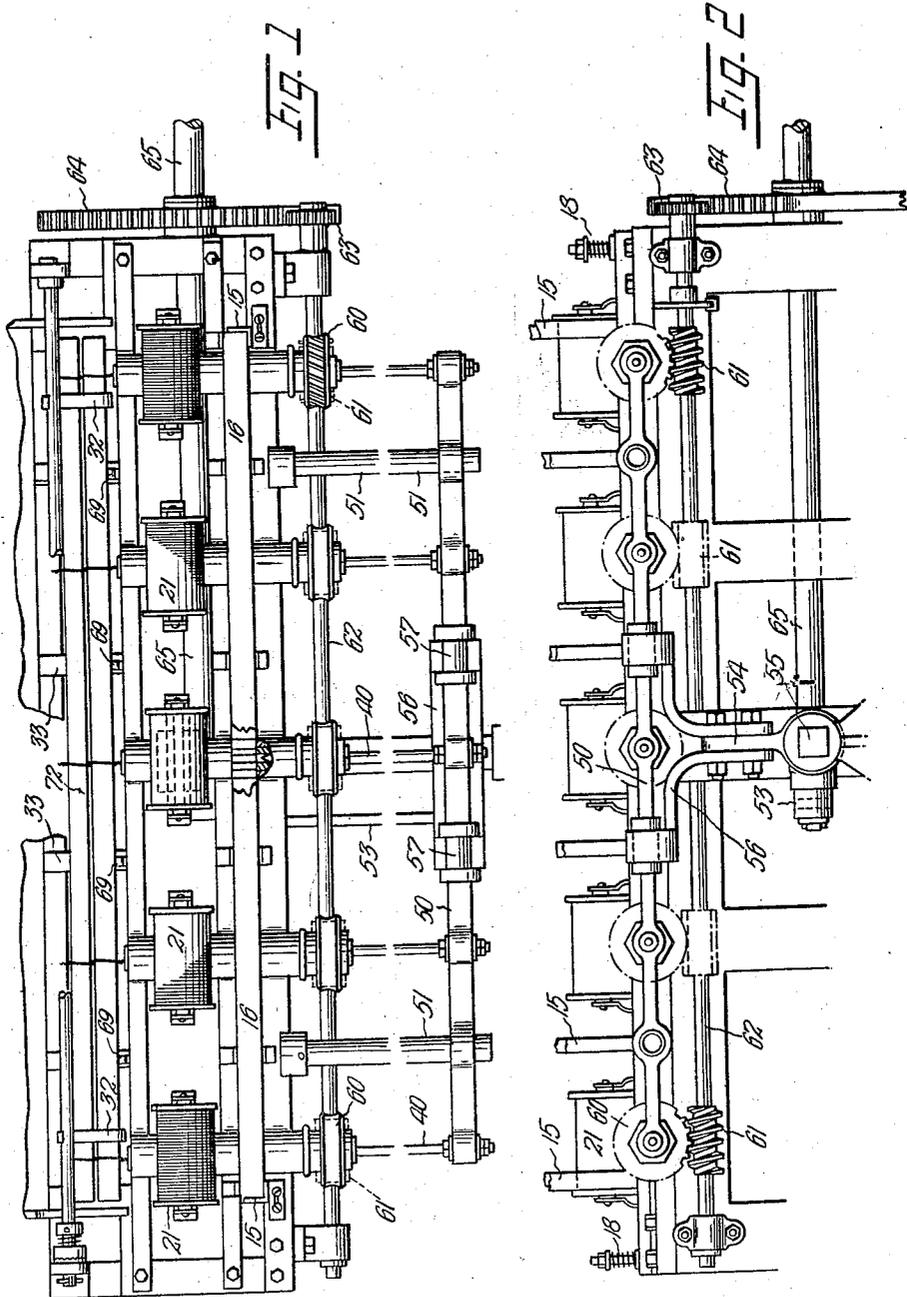
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J. FRIEND

MACHINE FOR WEAVING SLAT BLINDS

Filed Aug. 13, 1923

2 Sheets-Sheet 1



INVENTOR:

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By Roberts & Co.  
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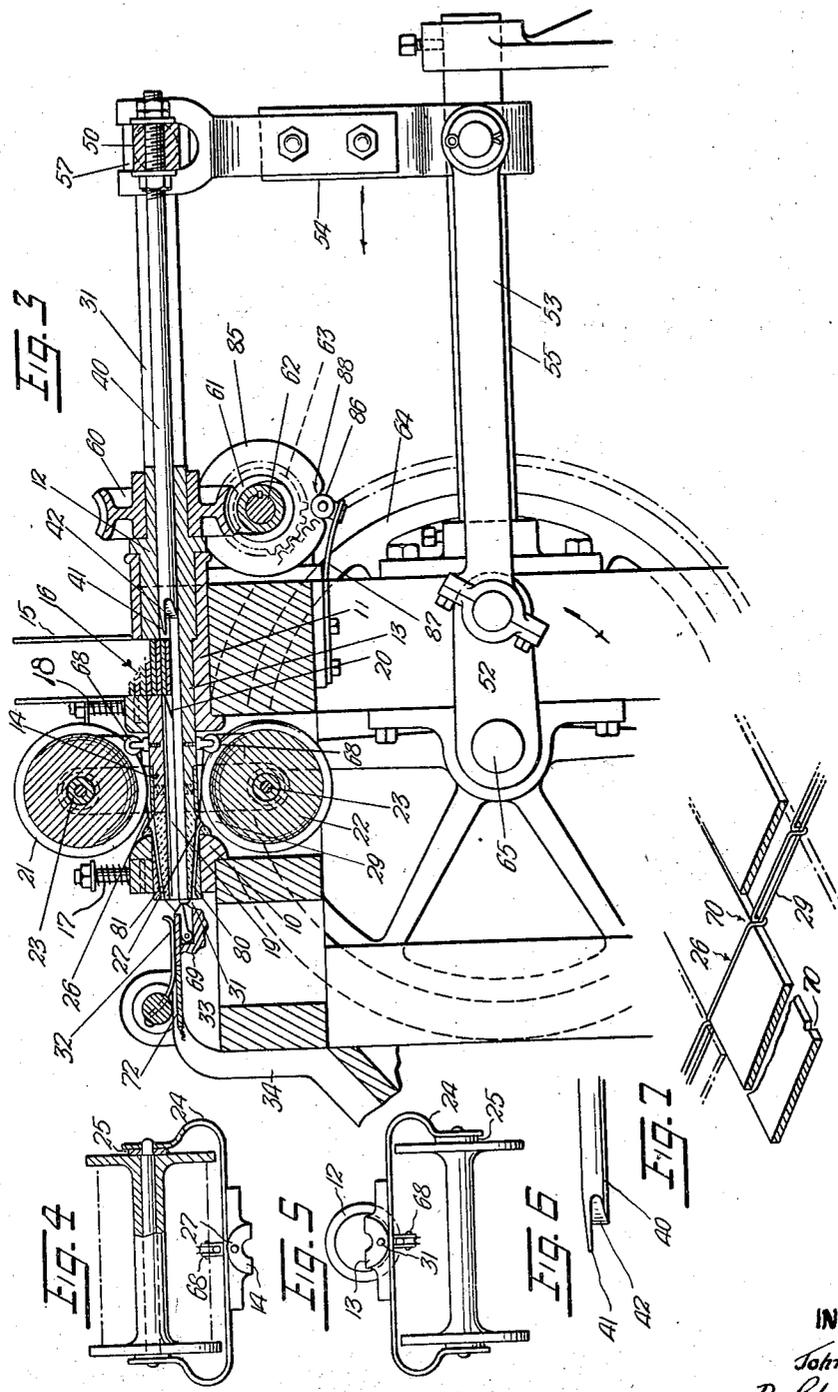
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J. FRIEND

MACHINE FOR WEAVING SLAT BLINDS

Filed Aug. 13, 1923

2 Sheets-Sheet 2



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# UNITED STATES PATENT OFFICE.

JOHN FRIEND, OF COOGEE, NEAR SYDNEY, NEW SOUTH WALES, AUSTRALIA.

MACHINE FOR WEAVING SLAT BLINDS.

Application filed August 13, 1923. Serial No. 657,253.

*To all whom it may concern:*

Be it known that I, JOHN FRIEND, subject of the King of Great Britain, residing at 31 Carr Street, Coogee, near Sydney, New South Wales, Australia, have invented certain new and useful Improvements in Machines for Weaving Slat Blinds, of which the following is a specification.

This invention relates to machines for weaving wood slats, that is to say lacing them together by means of warp cords or wires to produce a flexible slatted structure usable as a window blind or screen.

In the accompanying drawings:—

Fig. 1 is a partial top plan of the machine;

Fig. 2 is a partial back end elevational view of the same;

Fig. 3 is an enlarged transverse sectional elevation of the same;

Fig. 4 is a broken sectional elevation of the upper one of the pair of cord spools and its carrier which is associated with each of the warping mechanisms;

Fig. 5 is an elevational view of the companion warp cord spool;

Fig. 6 is a fragmentary elevational view of the end portion of one of the stripper plungers; and

Fig. 7 is a fragmentary perspective view explanatory of the lay of the warps by which flat slats are flexibly connected to form a continuous woven structure suitable for a blind. The slats are usually of wood, and vary in width from about three-eighths to two and a quarter inches and are about half the thickness of conventional Venetian blind slats. These slats may, however, be made of metal.

The main frame of the machine carries bearings 10 and 11 for rotary tubular sleeves one for each warp; these sleeves are constituted of cylindrical rear hub portions 12 having an integral forward extension or lower sleeve section 13, and a separate upper movable extension member which forms the upper section 14 of the sleeve. The division is diametrically across the tubular centre. 80 and 81 are thimbles of glass or porcelain fixed in the ends of the parts 13 and 14, and 68 are fair lead sheaves over which the warp cords or wires run from the spools 21 and 22 to the thimbles 80 and 81. The thimbles resist wear by the running of the warp cords during weaving; metal, however hard, is rapidly worn in this position

and is therefore objectionable. A parallel-side frame-hopper 15 contains the slats 16 which are stacked therein one on top of the other on the flat. The width and length of this hopper is adjustable in order that it may be set to accommodate slats of any particular length and width. The lowermost slats in the stack set in the clearance spaces between the hubs 12 of the rotary sleeves and the back ends of the rotary sleeve caps 14. Each of these caps 14 with its glass or porcelain thimble 80 is carried in the vertically slidable top halves of the bearings 10 and 11, and is retained in register with the lower section 13 of the sleeve and forced down by jockey springs 17 and 18 which bear down on the bearing caps. 19 is a central hole extending through the complete split sleeve and its cylindrical hub 12, and 20 is an angular face on the bottom back edge of each sleeve cap 14 immediately forward of the slat stack 16. The cord spools 21 and 22 are respectively mounted for rotation on spindles 23 supported in spring bracket arms 24, 25 being cork washers which are pressed against the spool ends by the spring arms and function as brakes to prevent racing of the spools in the dwell intervals between the drawing of the warp cords. The warp cord 26 drawn from the upper spool 21 at each sleeve is reeved under the swivelling fair lead sheave 68 and through an angularly disposed hole 27 in the thimble 81 of the sleeve cap 14; similarly the warp cord 29 from the lower spool 22 is drawn through a corresponding sheave 68 and hole 31 in the thimble 80 of the lower extension 13 of the sleeve. 32 are spring presser shoes which are located forwardly of the sleeve nozzles and are arranged to bear downward on the slats to hold them flat on the horse or carrier bed 33 over which the weave of slats 72 is delivered. 69 are spring pawls on the carrier table, intermediate the sleeves. These pawls engage behind each slat when it is moved onto the table, and hold the slat whilst the warp cords are crossing and binding it, the tightness of the weave being thus ensured and the necessity for laying up the slats in the warp sheds being thus obviated. 34 is the take off race in which the weave of slats passes down as a longitudinally flexible structure. 40 is one of the stripper-plungers. Its forward end is formed to a horizontally disposed blunt chisel edge 41, pro-

jecting beyond a vertically disposed blunt chisel edge 42, the chisel edge 41 functioning as a stripper by entering between the lowermost slat in the stack and the slat next  
 5 above it, and the chisel point 42 functioning as a feeder, forcing the bottom slat forwardly out of the hopper under the rising sleeve cap 14 and along between the sleeve extension 13 and cap 14 onto the horse or  
 10 carrier bed 33 to be held there by the spring shoes 32 and the check pawls 69 during the closing of the sheds and the binding of the warp cords, which takes place whilst the stripper-plunger is retiring or is retired to  
 15 the position shown in Fig. 3. The stripper-plunger 40 dwells in this retired position during the revolution of the spools 21 and 22. The slat feed movement and the warp twisting movements thus occur successively.

20 The stripper-plungers 40 work through axial guide holes 19 in the sleeves. The level faces of the lower extensions of the sleeves form slide beds along which the slats are pushed by the stripper-plungers onto  
 25 the carrier table. The machine contains a plurality of sleeve elements, one only of which is shewn in Fig. 3, the number thereof varying according to the length of the slats required to be woven and the number  
 30 of warp cords to be used in the weave. In Fig. 1 the machine is shewn as constructed for weaving blinds with slats of considerable length to form a blind having five warps weaving the slats together. Flexible  
 35 stranded wire may be used instead of cordage for the warps.

The stripper-plungers 40 are fixed at their rear ends to a slide beam 50; this slide beam is horizontally oscillatable on rod slide  
 40 guides 51, the oscillation being performed at timed intervals by a crank 52 connected through a rod 53 to a vertical arm 54 having a bearing on a slide guide rod 55, the movement being applied to the beam 50 through  
 45 a fork 56 engaging the fitted portions 57 of the beam. The crank 52 is keyed to the shaft 65 and the timing is arranged so that the stripper-plungers will be advanced to push a slat from the stack 16 onto the carrier  
 50 bed 33 during the dwells in the rotation of the sleeves 12. Or the timing may be arranged so that the to and fro movements of the stripper-plungers and the rotations of the sleeve 12 alternate, in which case  
 55 the stripper-plungers are at their rest or dwell positions as in Fig. 3 whilst the sleeve 12 is in rotation and the twisting of the warp cords is being effected. On each of the sleeves 12 a worm wheel 60 is fixed. These  
 60 worm wheels are driven simultaneously by worms 61 on a shaft 62 so they are rotated in unison. Intermittent drive is communicated to the worm shaft 62 through a spur pinion 63 which is driven intermittently by  
 65 an interrupted spur tooth wheel 64, which is keyed to the shaft 65. A locating check roller 86 carried by a spring arm 87 co-acts with a bay 88 in the collar 85 to hold the worm shaft 62 centred at dwell position. The sleeves are intermittently rotated always  
 70 in the same direction and at their rest position the warp cords form a shed into which whilst they are at rest the slat next to be taken into the weave is introduced.  
 75 Other mechanical means for procuring alternated rotational movement of the sleeves and sliding movement of the stripper-plungers in alternate order may be used. Such means are well known to mechanical  
 80 engineers.  
 In operation, a stack of slats 16 is set in the hopper 15, the bottom slat resting on the flat top face of each of the sleeve sections 13. The weight of the slats in the hopper operates to bring the rotation of the sleeves  
 85 to rest and to locate the sleeves for the feed movement so that the slide beds formed by the flat faces of the sleeve extensions will set horizontally. In the forward movement of the beam 50 the stripper-plungers 40 engage  
 90 the lowermost slat in the stack, pushing it from the superposed slats; in this engagement the edge of the engaged slat when it is of wood is nicked at 70 (see Fig. 7) by the pressure of the blunt chisel edges 42  
 95 against it and the slat is pushed forwardly under the ramped faces 20 of the sleeve caps, thus lifting the caps against the springs 17 and 18. Forward movement of the slat is continued until it passes out of the opened  
 100 divisions in the sleeves and into the warp cord sheds, past the check pawls 69, and under the spring presser foot 32, into the position shewn at 72 in Fig. 3. The sleeves now make a rotation, with the result  
 105 that the shed of the cords 26 and 29 is closed on the slat and the cords are twisted to bind the slat, the twist of the cordage setting in the slat edge notches 70. During the twisting movement the stripper-plungers 40 are  
 110 retired either fully or may be only sufficiently to clear the warp cords; when the warp twisting movement (Fig. 7) has been completed, the same cycle of operations is repeated. The slats are thus taken one by  
 115 one from the bottom of the stack 16 and woven in flat order by the warp cords. When the required length of weave has been produced, the machine is stopped and selvage ends of the warp cords are drawn  
 120 through manually and the cords tied at the end slat. The warp cord ends protruding from the machine are tied together before the machine is re-started. The cork washers  
 125 25 impose sufficient friction on the rotation of the spools 21 and 22 to apply the necessary tension on the cords in the weave.  
 As the sleeves 12 rotate, the pack of slats 16 is jiggged upward in the hopper 15; this  
 130 jiggging is no detriment, but it facilitates the

settling down of the slats and the arrest of the sleeve rotation so that engagement of the stripper-plungers 40 with the bottom slat is assured at each movement.

5 What I claim as my invention and desire to secure by Letters Patent is:—

1. A machine for weaving wood slats with flexible warp cords or wires, comprising a horizontally disposed slat hopper, a plurality of tubular sleeves transversely arranged below said hopper with means for rotating said sleeves simultaneously but intermittently, a plunger adapted to slide through the tubular centre of each of said sleeves and means for reciprocating said plungers intermediate the rotational movements of the sleeves, transverse slots in the sleeves below the hopper bottom, forward split extensions on said sleeves, one integral with the sleeve stem and the other movable laterally in relation to it in spring loaded bearings, a warp cord spool mounted diametrically opposite on the forward portions of said sleeves, lead holes for the warp cords through the nose portions of said sleeve extensions, and a table located in front of the sleeve nozzles,—the whole arranged for the alternate stripping of slats from the bottom of the stack in the hopper, the forcing of said slats between the sleeve extensions on to the carrier table, and after retirement of the feed plunger the rotation of the sleeves to close the sheds of the warp lines and to bind the warps on the slats.

2. A slat weaving machine according to claim 1 wherein the plunger is formed with a stripper beak arranged to enter between the lowermost slat in the stack and the slat next above it, in the forward movement of said plunger.

3. In a slat weaving machine according to claim 1, a stripper-plunger having its forward end formed to a chisel edge 42 adapted to indent the slat edge and an overhanging stripper beak 41 adapted to separate the lowermost slat in the stack from the slats above it.

4. In a slat weaving machine according to claim 1, nozzle pieces of vitreous material

fitted to the sleeve extensions to carry the lead of the warp cords. 50

5. A slat weaving machine according to claim 1, characterized in that warp cord spools are mounted respectively on the halves of each longitudinally split sleeve, and that one of said sleeve halves is mounted in slide bearings which permit it to rise to offer clearance for the sliding forward of slats from the hopper into the shed of the warp cords which pass from said spools through lead holes in the sleeve nosing. 55 60

6. In a slat weaving machine according to claim 1, feeding plungers stripping the slats one by one from the bottom of a loose stack by being forced through intermittently rotatable split sleeves, a warp cord spool carried by each of said sleeves and means for causing the said slat feeding plungers to function intermediately the rotation of the sleeves in which the sheds of the warps are closed on each slat successively. 65 70

7. In a slat weaving machine according to claim 1, a horse or carrier bed located forwardly of the split sleeves with spring fingers arranged to receive the slats successively as they are advanced on to said horse or bed and to hold said slats during the closing of the warp shed and the locking of the warp cords. 75

8. In a slat weaving machine according to claim 1, pawl checks on the carrier table adapted to engage the slats when they are advanced into the sheds of the warp cords and to restrain them against backward movement during the closing of the sheds and the crossing of the warp cords. 80 85

9. In a slat weaving machine according to claim 1, a hopper, warped spool sleeves at the discharge end of said hopper, means for intermittently rotating said sleeves, said means being adapted to be checked by the weight of the slats in the hopper, and the sleeves arranged by said weight during the dwell in their rotation with the slat slide beds thereon disposed horizontally. 90 95

In testimony whereof I affix my signature.

JOHN FRIEND.