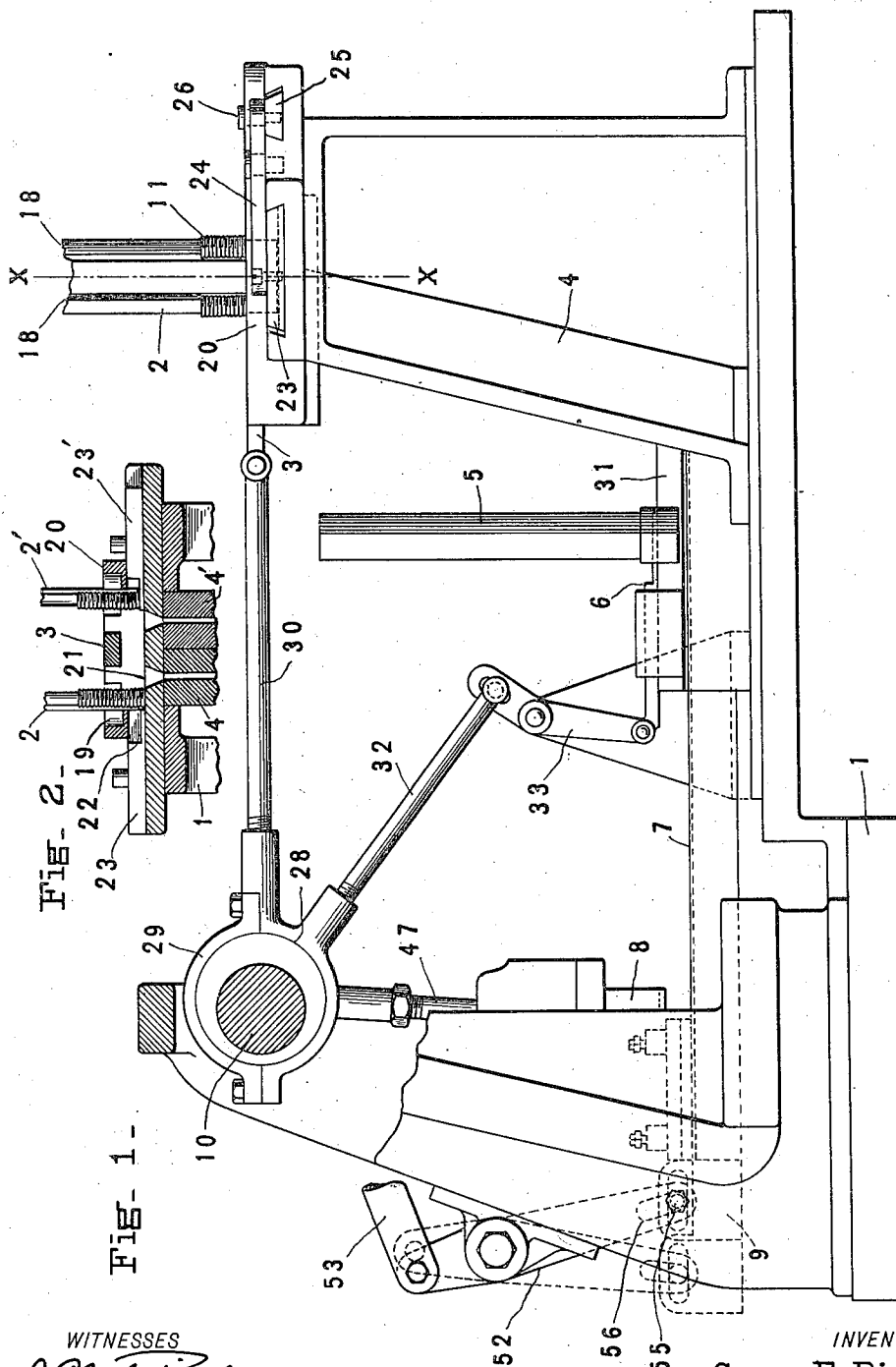


1,043,896.

G. E. BIGELOW.
STRANDING MACHINE.
APPLICATION FILED NOV. 29, 1907.

Patented Nov. 12, 1912.

4 SHEETS-SHEET 1.



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4 SHEETS—SHEET 2.

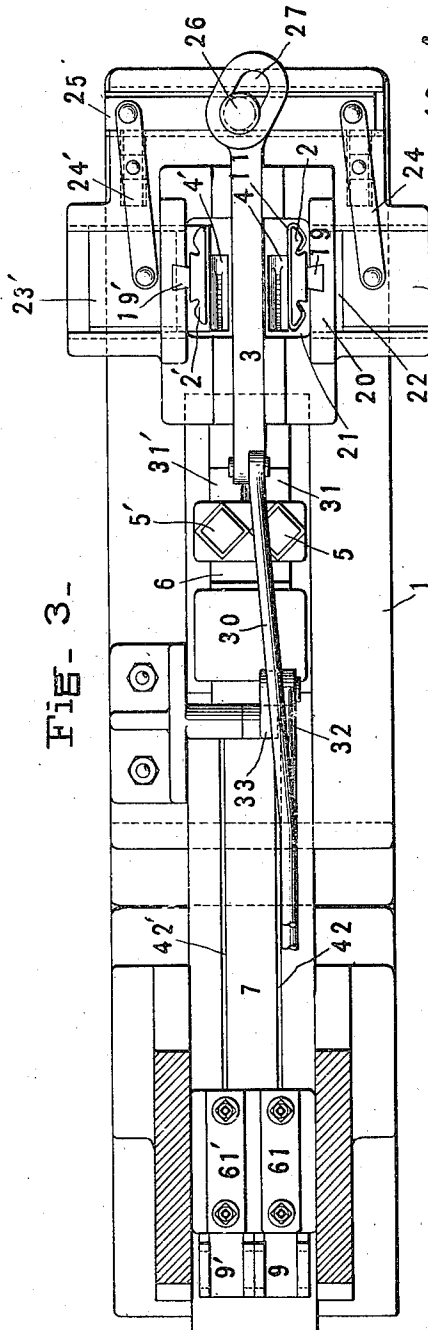


Fig- 3-

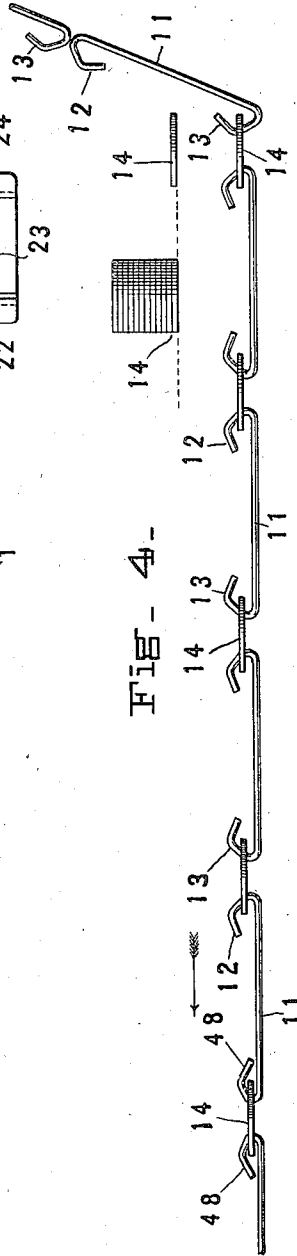


Fig- 4-

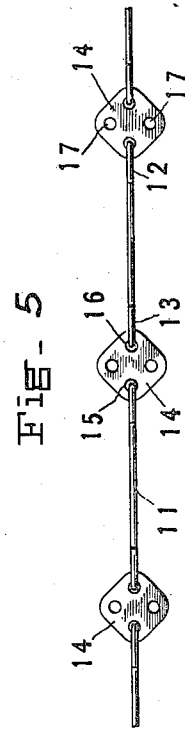


Fig- 5-

Fig- 6-



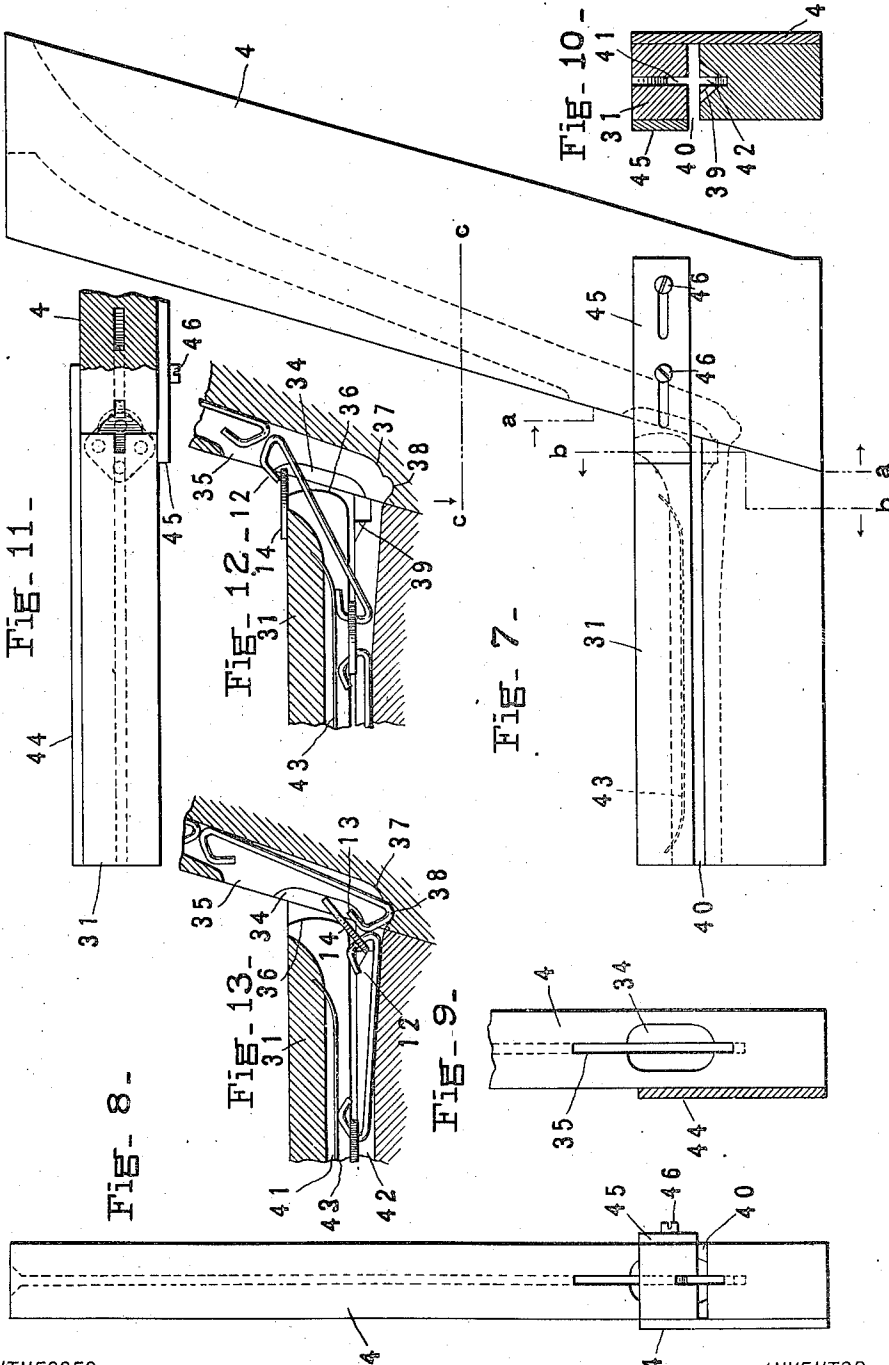
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4 SHEETS-SHEET 3.

1,043,896.



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1,043,896.

Fig- 17-

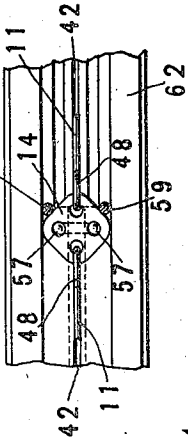


Fig- 16-

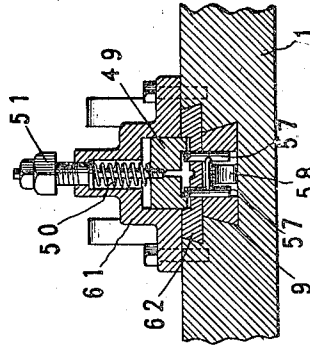


Fig- 14-

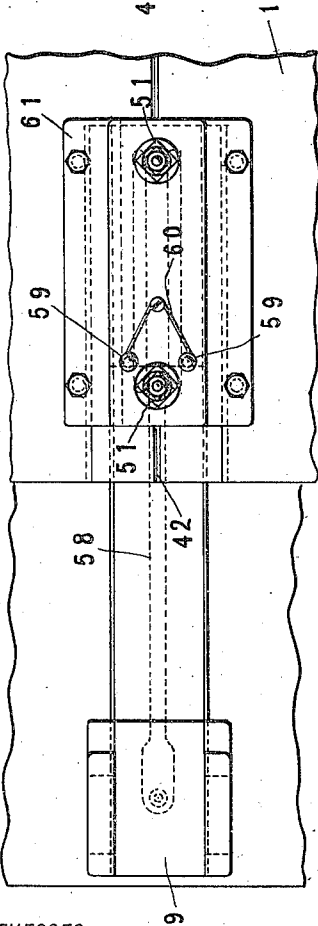
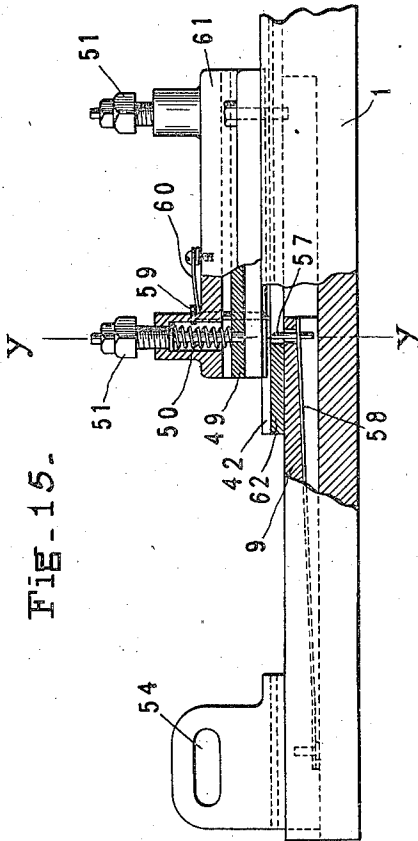


Fig- 15-



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UNITED STATES PATENT OFFICE.

GEORGE E. BIGELOW, OF WATERBURY, CONNECTICUT, ASSIGNOR TO THE MATTATUCK MANUFACTURING COMPANY, OF WATERBURY, CONNECTICUT, A CORPORATION OF CONNECTICUT.

STRANDING-MACHINE.

1,043,896.

Specification of Letters Patent.

Patented Nov. 12, 1912.

Application filed November 29, 1907. Serial No. 404,392.

To all whom it may concern:

Be it known that I, GEORGE E. BIGELOW, a citizen of the United States, residing at Waterbury, in the county of New Haven and State of Connecticut, have invented certain new and useful Improvements in Stranding-Machines, of which the following is a specification.

My invention relates to machines for assembling links and plates to form strands such as are used in making bed fabrics. The use of the strands formed in my machine is however immaterial and the shape and proportion of the plates and links may be varied without departing from the scope of my invention. Heretofore the links and plates for forming such fabrics have been assembled by hand, which is slow and expensive.

It is the main object of my present invention to assemble links and plates into strands which may afterward be connected by hand, or automatically to produce the completed fabric. I have also sought to perfect the details of the mechanism so that all parts work together automatically.

Briefly considered the invention contemplates supplying links and plates to an assembling device, drawing the links through and thus picking up the plates and interlocking them with the links, and then closing the links down on the plates. By the term "links" I intend to refer generally to a member having an open hook at each end. Such links are usually formed of wire in suitable wire working machines. By the term "plate" I refer generally to a relatively flat member having recesses or perforations in opposite corners. These are usually stamped square from strips of sheet metal and have four holes, one in each corner, although they are sometimes triangular in outline and supplied with only three holes. The machine illustrated has the assembling mechanism in duplicate for convenience and economy in construction and operation.

Figure 1 is a longitudinal side view of a machine embodying my invention, parts being broken away in order to better illustrate the principles. Fig. 2 is a vertical section

on the plane of line X—X Fig. 1. Fig. 3 is a plan view and partial section of the machine. Fig. 4 is a side view showing the relative positions of the links and square plates in the machine, at the end of a cycle. Fig. 5 is a plan view of a fragment of a strand composed of links and plates. Fig. 6 is a detail view of a triangular plate with three holes. Fig. 7 is a side view of the assembling device proper. Fig. 8 is a front elevation of the same taken from the left of Fig. 7. Fig. 9 is a view of the link chute on the plane of the line *a—a*. Fig. 10 is a section of the strand channel on the plane of the line *b—b*. Fig. 11 is a plan view and section on the plane of the line *c—c*. Fig. 12 is a vertical section at the assembling point showing a link in position to engage a plate. Fig. 13 is a similar view showing the same plate, a little later in the same cycle of the machine turned over and in position to engage the next link. Fig. 14 is a plan view of a single tension device. Fig. 15 is a longitudinal side view and partial section of the same. Fig. 16 is a transverse sectional view of the same on line *y—y* of Fig. 15. Fig. 17 is a fragmentary plan view showing details of the tension device.

A suitable frame 1, carries all parts of the mechanism. The links are supplied on guides 2, 2' and fed by a rod 3 and intermediate mechanism into chutes 4, 4'. The plates are supplied in tubes 5, 5' and fed by a plunger 6 to the assembling point in front of the chutes 4, 4'. After assembling, the strands are drawn over the bed 7 and beneath a hammer 8 by tension devices 9, 9'. All the moving parts are driven from the main shaft 10 as will be understood hereinafter. One revolution of the shaft completes a single cycle of operations or stroke of the machine. Each cycle adds one plate and one link to each strand. In the particular form shown each link 11 is made of wire with a straight shank and hooks 12 and 13 at the ends. Each plate 14 has front and rear holes 15 and 16 and side holes 17, 17'. The triangular plate 14' shown in Fig. 6 is used sometimes in making the side strands of a fabric.

Link supply.—Each guide 2, is shaped to

receive a column of the links 11, 11, laid sidewise and has vertical grooves 18, 18, in which the hooks slide. The guide 2, has a projection 19, removably fitting in a correspondingly shaped recess in the support 20, so that the guide is supported above the platform 21, with space enough between to allow for the reciprocation of the tip 22 of the feed plunger 23. A pivoted lever 24, connects the plunger with the slide 25. The opposite plunger 23' is similarly connected by lever 24' and reciprocation of the plungers is effected by the reciprocation of slide 25. The pin 26 on slide 25 coacts with the inclined slot 27, in the end of rod 3, so that when rod 3 is reciprocated by the action of eccentric 28, strap 29, and arm 30, the slide 25, is reciprocated. Each rotation of the main shaft 10, thus causes, through the medium of the mechanism just described, a feed of one link from the bottom of the guides 2 and 2' alternately into the chutes 4 and 4' respectively. The mouth of each chute is funnel shaped (Fig. 2.) and being shorter than the length of a link (Fig. 3.) causes the link to turn edgewise and tip up and fall down the chute endwise (Fig. 4.). The chutes are thus kept supplied with links. The guides may be strung with links in any suitable manner and loaded guides substituted for the empty guides as often as is necessary.

Plate supply.—The tubes 5, 5' are filled with the stamped flat plates 14, 14 which are thus arranged in columns above the path of movement of the feed plunger 6 on the tables 31, 31'. The feed plunger is reciprocated, each revolution of the main shaft 10, by means of the eccentric 28, strap 29, arm 32, and lever 33 and a plate 14 is fed from the bottom of each tube to the front of the link chutes (see Sheet 3) so that one corner of a plate projects beyond the edge of the table and into the path of movement of the upper hook 12 of a link (see Fig. 12). To permit this, a recess 34, in the front of the link chute is provided, which intersects the link channel 35.

Assembling.—At the end of a stroke of the machine the links and plates are in the relative positions of Fig. 4. As the strand is pulled along, the rear hook 12 of a link enters the front hole of the projecting plate, tilts the plate up and pulls it down over the curved end 36, of the table (Fig. 12). The next link in the chute follows after by gravity and is thrown forward by the curved surface 37, into the pocket 38, where it momentarily stops. At the same moment the front end of the plate 14 catches slightly against the shoulder 39, and the tension on the strand throws the rear end of the plate down to engage the front hook 13 of the link following. The movement of the stroke

continues sufficiently to complete the engagement and lift the front hook, just engaged, out of the pocket 38 and carry it slightly to the left of the position shown in Fig. 13. The plates of the interlocked strand travel in the horizontal groove 40 while the hooks of the links are guided in the groove 41 and the shanks of the links in the groove 42, the spring 43 serving to hold the parts yieldingly in position. Side movement of the plates during the assembling operation is prevented by the guards 44 and 45. The latter is movable, being clamped by screws 46, 46, so that access may be had to the plates and links when originally starting the machine.

Hook closing.—As the two strands travel along the bed 7, the shanks of the links in the grooves 42 and 42', a hammer 8, raised and lowered by rod 47 in the usual manner of stamps on presses, descends and strikes at each stroke the two hooks attached to a plate and closes them as at 48, 48 (Fig. 4.).

Strand tension.—The completed strands pass under friction shoes such as 49 (see Sheet 4). Each shoe is pressed down on the strand plates by springs such as 50, adjustable by nuts 51, 51. Each tension slide 9 is operated by a lever 52 and arm 53 from shaft 10 in a manner similar to the plate feed heretofore described. The slot 54 permits adjustment of the bolt 55 for changing the stroke of the tension device, while the slot 56 permits the relative swinging and sliding movements of lever 52 and slide 9 respectively. The rear end of slide 9 carries two pins 57, 57, which are pressed upward by a spring 58 and adapted to snap into the side holes 17, 17 of a plate so as to pull the strand along. The slide is shown in full in Fig. 15 and dotted in Fig. 1 at the left hand end of its stroke. When it starts back toward the right, the incline or bevel of the pins 57, 57, causes them to be disengaged and allows them to snap under the following plate and thence up into its holes for the next tension stroke. To prevent any possible backward movement of the strands I provide stop pins 59, 59 pressed down by spring 60 and beveled toward the rear so as to permit forward movement of the plates 14, 14 but prevent backward movement. For convenience in construction, adjustment and repair the friction shoes and stop pins are carried by the covers 61, 61' which are bolted or otherwise suitably secured to the frame. The part 62 of the bed which lies beneath a shoe 49 is also preferably made separate so that the parts may be readily manufactured and repaired.

In the mechanism shown, two strands are formed simultaneously and fed out through the grooves 42 and 42' (see Fig. 3). The

feeding of the links from the guides 2 and 2' is effected by alternating the movement of the slides 23 and 23' respectively and the feeding of the plates is effected by the plunger 6 reciprocating beneath the supply tubes 5 and 5'. This arrangement requires a fewer number of parts and is more compact and less expensive to operate than two separate machines. As two strands are being formed side by side they can be readily connected by cross links as they come out from the delivery end of the machine either by hand work or by separate mechanism so as to form a fabric.

The operation and advantages will be understood from the foregoing specification and the drawings. I do not however consider the invention limited to the combination or to the details set forth except as specified in the following claims.

What I claim is:

1. In a stranding machine the combination of link and plate supplies, means for interlocking the plates and links, means for closing the link hooks, and means for applying tension to the strand.

2. In a stranding machine the combination of link and plate supplies, means for automatically assembling the plates and links, and means for applying tension to the strand.

3. In a stranding machine, a chute, a table, means for supplying links to the chute, and means for supplying plates to the table in front of the chute and in the path of movement of the links.

4. In a stranding machine, a link supply chute, means for feeding plates in front of the chute in the path of movement of the links, and means for applying tension to the strands.

5. In a stranding machine, a chute, means for supplying links thereto, a table in front of said chute for receiving plates in the path of movement of said links, and means for applying tension to interlock the links and plates.

6. In a stranding machine, the combination of two chutes, means for supplying links thereto, means for supplying plates in the paths of movement of links through said chutes, and means for moving said links and plates after interlocking.

7. In a stranding machine, the combination of alternately operable link supplies, simultaneously operable plate supplies, tension devices, and means for interlocking the plates and links when the tension devices operate.

8. In a stranding machine, a grooved link guide, a chute, and means for feeding links from said guide to said chute endwise.

9. In a stranding machine, a pair of link guides, a pair of chutes, and means for

alternately feeding links from said guides to said chutes.

10. In a stranding machine, a link guide, a chute having a mouth shorter than the links, and means for feeding a link horizontally with one end over the mouth of said chute whereby the link will fall endwise by gravity.

11. In a stranding machine, a platform, a chute having a narrow mouth leading from said platform, and means for feeding a hooked link on said platform, shank first, with one end over said mouth, whereby the link may turn sidewise and fall endwise down said chute.

12. In a stranding machine, a pair of link guides, a pair of feed plungers, a pair of chutes, and means for operating said plungers to feed links alternately first into one chute and then into the other.

13. In a stranding machine, a link chute and means for feeding a square perforated plate with a corner forward and in the path of a link for interlocking.

14. In a stranding machine, a link guide, a plate holder, plungers for feeding links and plates from said guide and holder, a main shaft, an eccentric carried thereby, a strap on said eccentric, and connection from said eccentric strap to said plungers.

15. In a stranding machine, a link chute having an opening in one side, a plate-supporting table adjacent thereto, and means for pulling links past the edge of said table to interlock with plates thereon.

16. In a stranding machine, a chute having a link channel and a recess intersecting the same, a table adjacent thereto for supporting a plate with one corner extending into said recess, and means for guiding said plate as it turns over in said recess.

17. In a stranding machine, a chute having a link channel, a table having a curved end adjacent thereto, and means for pulling a link through said channel so as to interlock with a plate on the edge of the table, turn the plate over the end of the table and cause it to interlock with the following link.

18. In a stranding machine, a link chute having a stop pocket at the bottom, means for interlocking a plate with a link above said pocket, and means for turning said plate over to engage the succeeding link when stationary in said pocket.

19. In a stranding machine, a link chute, means for hooking a link into a plate and turning the plate over, said chute having a curved portion to throw the succeeding link forward beneath the plate as it turns over.

20. In a stranding machine, a link chute having a stop pocket, a table having a curved end, and means for pulling links from said chute and interlocking with plates supplied on said table.

21. In a stranding machine, a link chute, and a table having a plate guiding groove beneath with vertical extensions to accommodate the links.
- 5 22. In a stranding machine, a link chute, and a table having a plate-guiding groove beneath with vertical extension to accommodate the links and a shoulder in the lower groove to throw the rear of a plate down.
- 10 23. In a stranding machine, a table having strand channels beneath and means for pulling links so as to interlock with plates supplied on the end of said table.
- 15 24. In a stranding machine, a table having strand channels beneath and means for pulling links so as to interlock with plates supplied on the end of said table, and yielding means for holding the strand in said channel.
- 20 25. In a stranding machine, means for pulling a strand so as to cause the end hook to engage a plate, and means for causing the plate to turn over and engage the front hook of a new link.
- 25 26. In a stranding machine, means for pulling a strand so as to cause the end hook to engage a plate, means for causing the plate to turn over and engage the front hook of a new link, and means for holding the new link stationary while being so engaged.
- 30 27. In a stranding machine, a main shaft, means controlled by the rotation thereof for pulling a strand so as to cause the end hook to engage a plate, means for turning the plate over as it is pulled along with the strand, so as to engage a new link, and means for supplying another plate in the path of movement of the rear end of said new link during the same rotation of said shaft.
- 35 28. In a stranding machine, a link chute, a plate table adjacent to but spaced apart therefrom, leaving a plate passage and guard plates on the sides of said passage.
- 40 29. In a stranding machine, a link chute, a plate table adjacent to but spaced apart therefrom, leaving a plate passage and guard plates on the sides of said passage, one of said plates being movable.
- 45 30. In a stranding machine, means for assembling plates and links, a grooved bed, means for closing the hooks of the links while the shanks are guided in the groove of the bed, and a tension device for the strand.
- 50 31. In a stranding machine, means for assembling plates and links, means for yieldingly engaging the links after they are interlocked with the plates, and means for applying tension to the strand.
- 55 32. In a stranding machine, the combination of means for assembling plates and links, and a tension device including a pair of upwardly projecting pins for engaging in the side holes of the plates.
- 60 33. In a stranding machine, the combination of means for assembling plates and links, and a tension device including a pair of upwardly projecting pins for engaging in the side holes of the plates, and a pair of downwardly projecting pins for preventing backward movement of the plates.
- 65 34. In a stranding machine, plate and link supplies, and a tension device for intermittently drawing the formed strand so as to add links and plates.
- 70 35. In a stranding machine, plate and link supplies, and a tension device for intermittently drawing the formed strand so as to add links and plates, said tension device including a friction shoe and a yieldingly mounted means for engaging the plates.
- 75 36. In a stranding machine, the combination of plate and link assembling means, a grooved bed with a pressure shoe, and pins for engaging in the side holes of the plates.
- 80 37. In a stranding machine, the combination of plate and link assembling means, a grooved bed with a pressure shoe, and pins for engaging in the side holes of the plates, and means for preventing the plates' backward movement.
- 85 38. In a stranding machine, plate and link assembling means, a bed, a spring-pressed shoe for the plates, and a spring-pressed pin for engaging in a side hole or recess in a plate.
- 90 39. In a stranding machine, plate and link assembling means, a bed, a spring-pressed shoe for the plates, and a spring-pressed pin for engaging in a side hole or recess in a plate, and spring-pressed means for preventing backward movement of the strand.
- 95 40. In a stranding machine, the combination with assembling means, of an adjustable spring-pressed friction shoe, a tension pin, a spring-pressed back-stop pin, and a removable cover carrying said pins.
- 100 41. In a stranding machine, the combination of assembling means with a tension device including a bed, a cover, a pressure shoe carried thereby, and means for adjusting either or both ends thereof.
- 105 42. In a stranding machine, means for guiding plates and links, including a grooved bed, means for closing the hooks of the links while the shanks are guided in the groove of the bed, and a tension device for the strand.
- 110 43. In a stranding machine, means for yieldingly engaging the links after they are interlocked with the plates and means for applying tension to the strand.
- 115 44. In a stranding machine, a tension device including a pair of upwardly projecting pins for engaging in the side holes of the plates.
- 120 45. In a stranding machine, a tension device including a pair of upwardly projecting pins for engaging in the side holes of the plates.
- 125 130

the plates, and a pair of downwardly projecting pins for preventing backward movement of the plates.

46. In a stranding machine, a tension device for intermittently drawing the formed strand, said tension device including a friction shoe, and a yieldingly mounted means for engaging the plates.

47. In a stranding machine, a grooved bed with a pressure shoe and pins for engaging in the side holes of the plates.

48. In a stranding machine, a grooved bed with a pressure shoe and pins for engaging in the side holes of the plates, and means for preventing the plates' backward movement.

49. In a stranding machine, a bed, a spring-pressed shoe for the plates, and a spring-pressed pin for engaging in a side hole or recess in a plate.

50. In a stranding machine, a bed, a spring-pressed shoe for the plates, and a spring-pressed pin for engaging in a side hole or recess in a plate, and spring-pressed means for preventing backward movement of the strand.

51. In a stranding machine, an adjustable

spring-pressed friction shoe, a tension pin, a spring pressed back-stop pin, and a removable cover carrying said pins.

52. In a stranding machine, a tension device including a bed, a cover, a pressure shoe carried thereby, and means for adjusting either or both ends thereof.

53. In a stranding machine, a link supply, means for moving hooked links therefrom, a plate supply, means for causing a perforated plate therefrom to engage the hook of one link, and means for turning over the plate to engage a hook on an adjacent link.

54. In a stranding machine, a link supply guide for hooked links, and a supply guide for perforated plates, said guides having intersecting paths, means for feeding hooked links and perforated plates in their respective guides so that the hooks of the links engage the perforations in the plates.

In testimony whereof I affix my signature in presence of two witnesses.

GEORGE E. BIGELOW.

Witnesses:

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