G. E. BIGELOW.

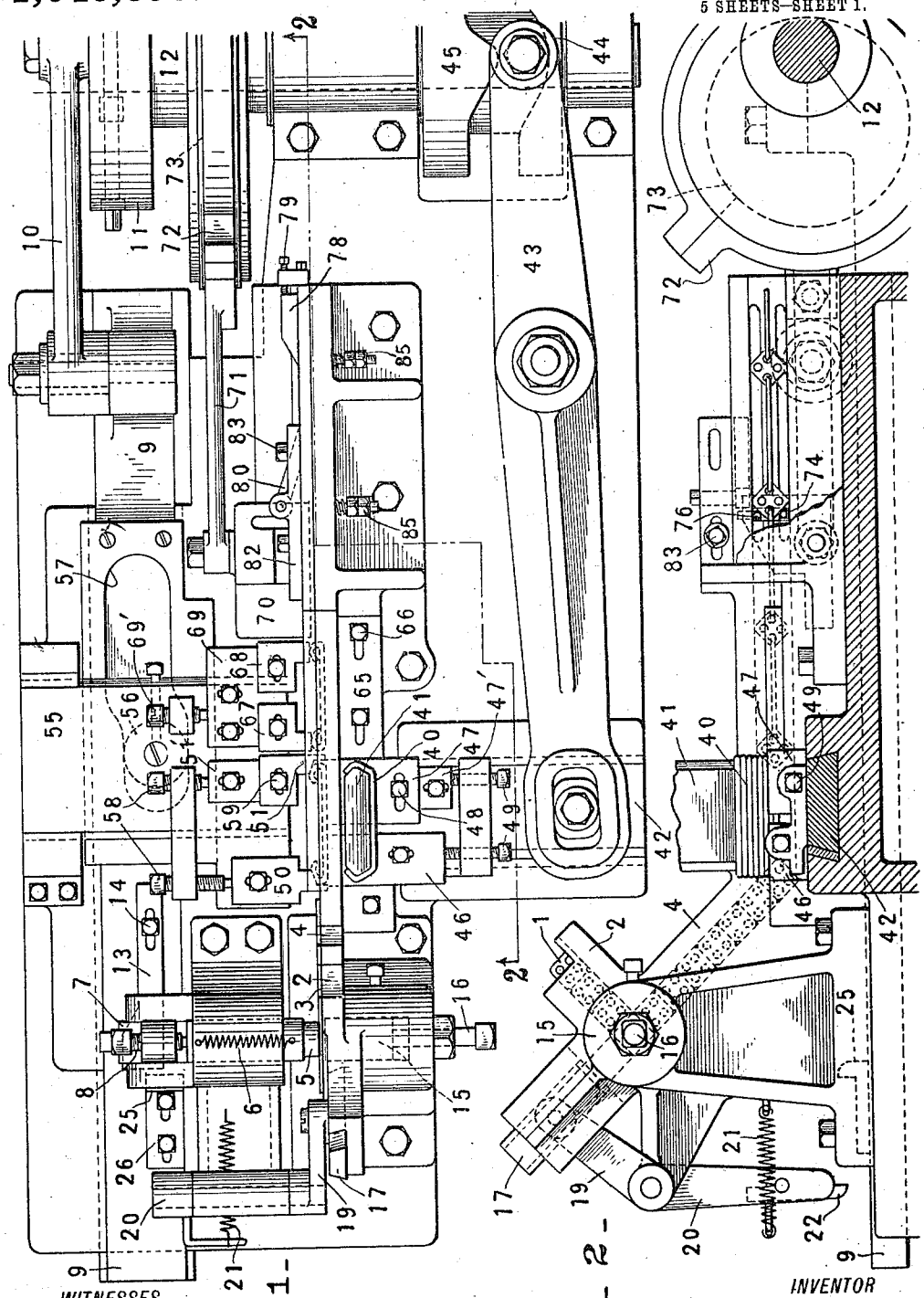
STRANDING MACHINE.

APPLICATION FILED MAY 10, 1909. RENEWED OCT. 1, 1912.

1,043,898.

Patented Nov. 12, 1912.

5 SHEETS—SHEET 1.



WITNESSES

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Fig. 1.

Fig. 2.

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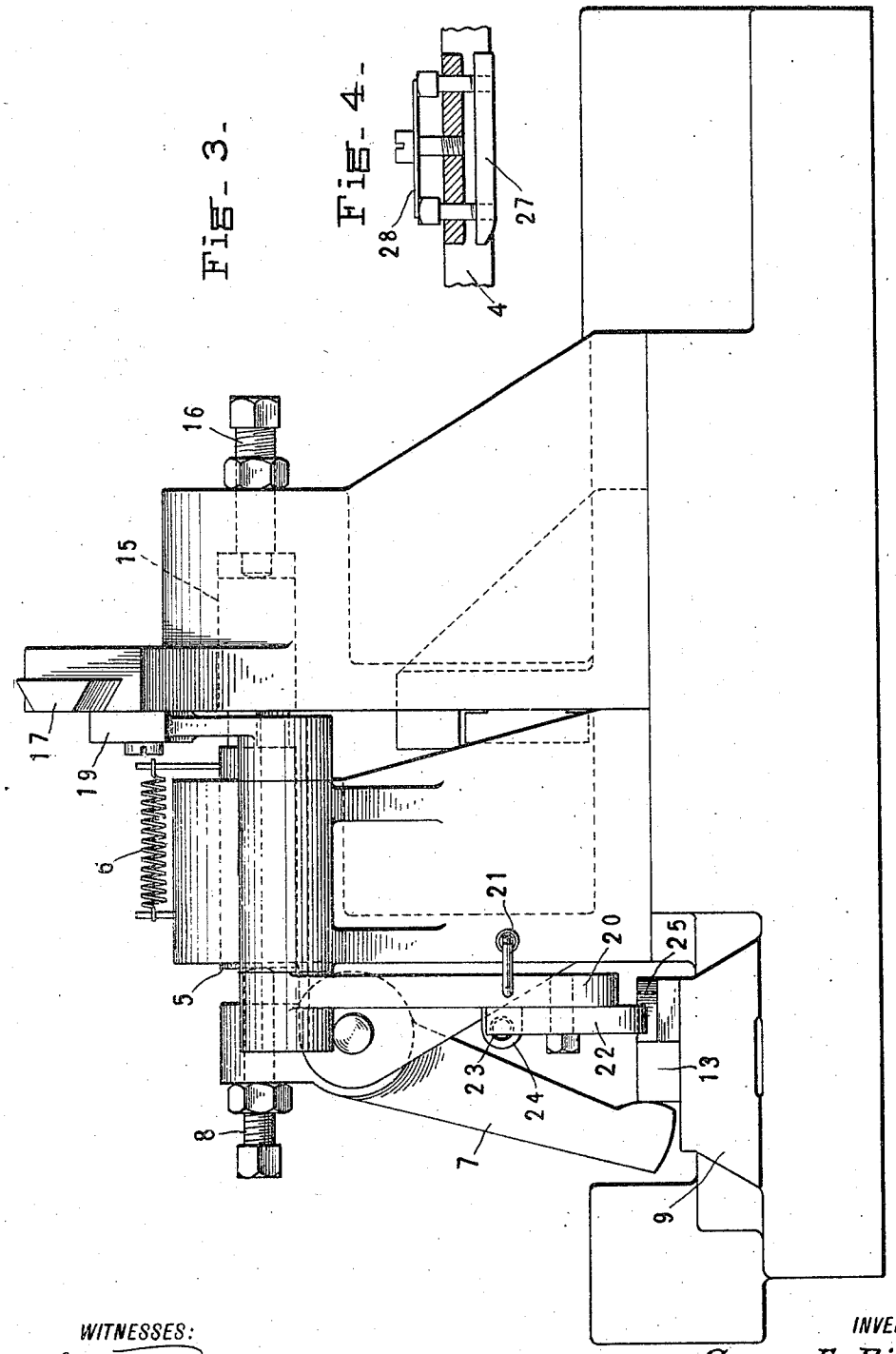
5 SHEETS—SHEET 2.

Fig. 3.

Fig. 4.



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5 SHEETS—SHEET 3.

Fig. 7.

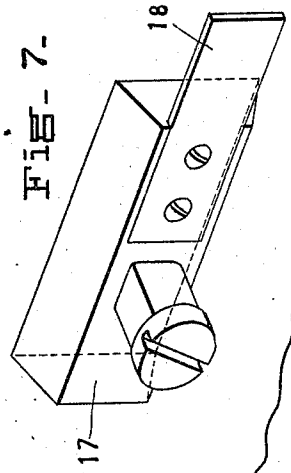


Fig. 6.

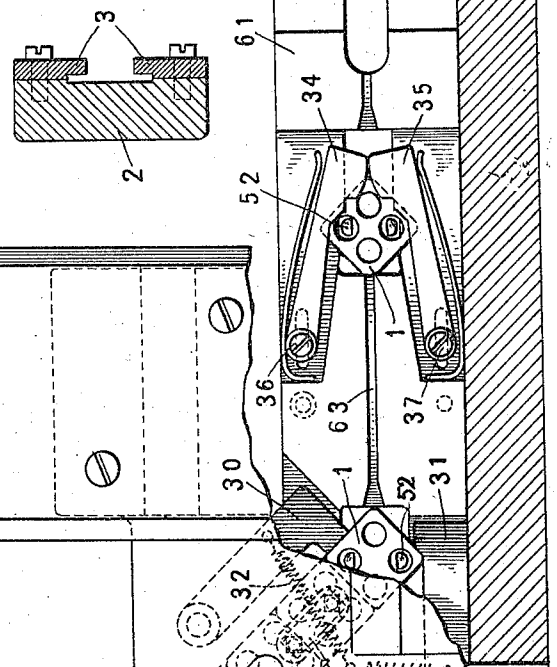
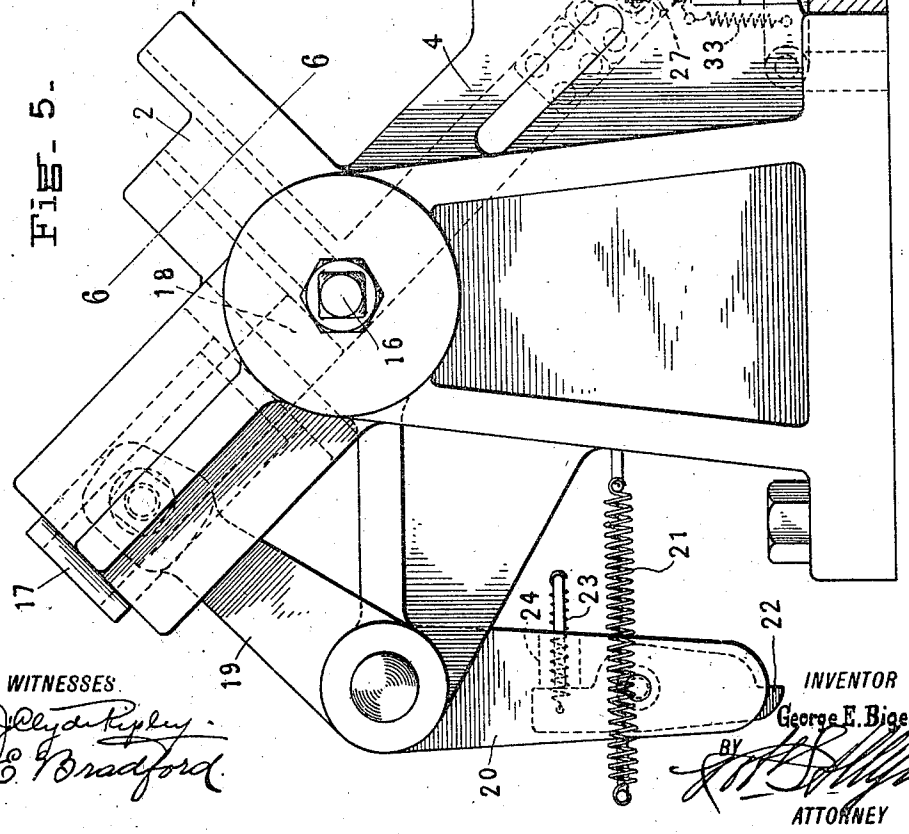


Fig. 5.



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5 SHEETS—SHEET 4.

Fig. 8.

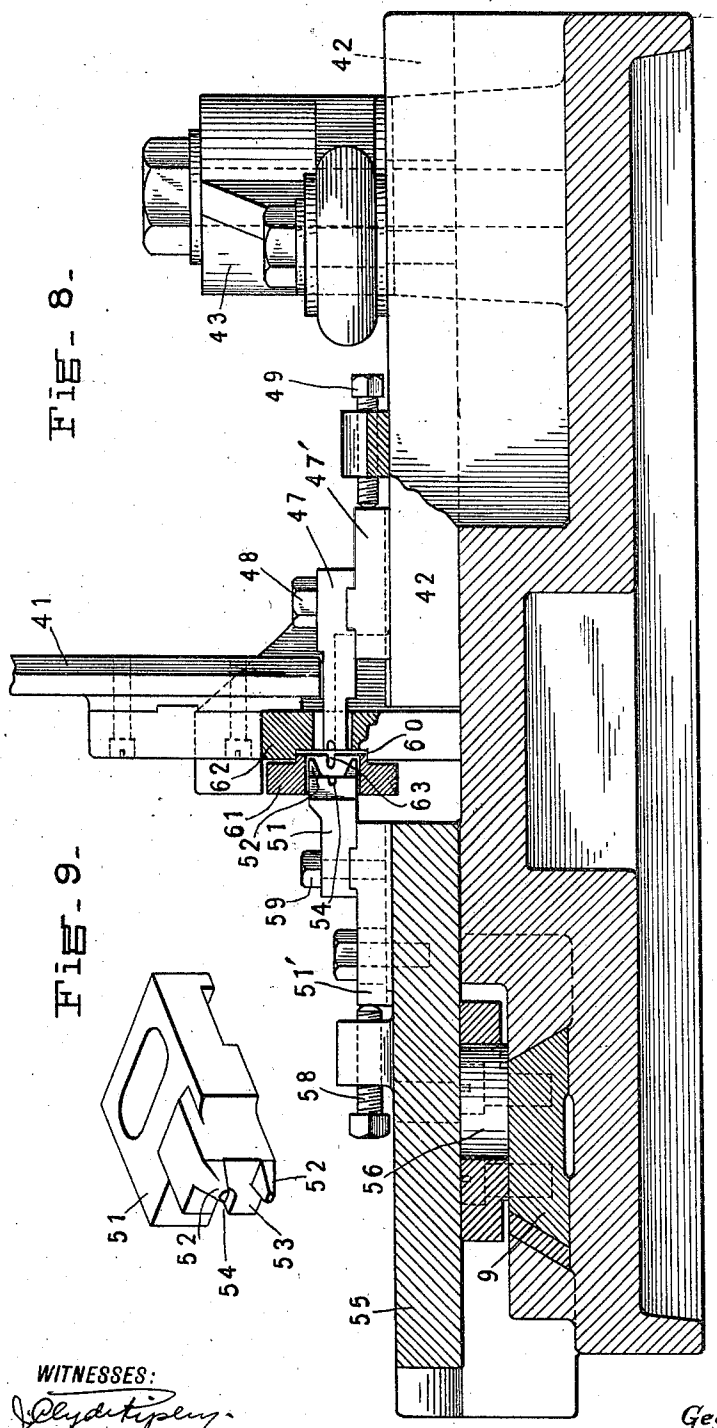


Fig. 9.

Fig. 11.

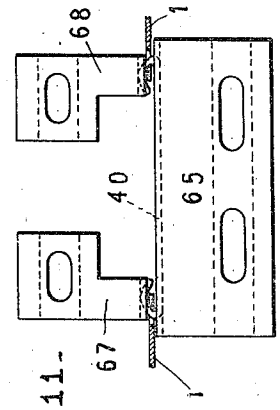
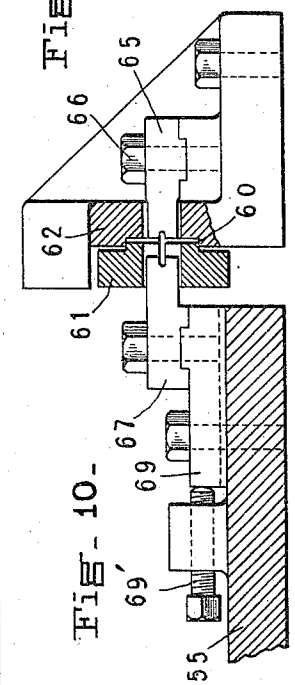


Fig. 10.



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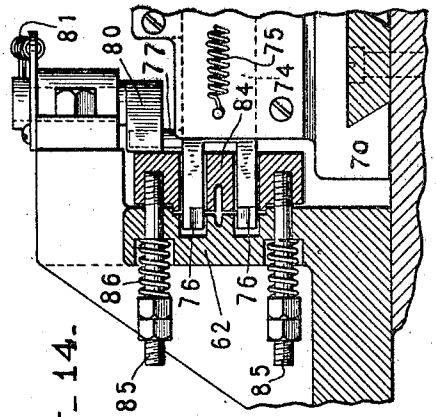

Fig. 14.

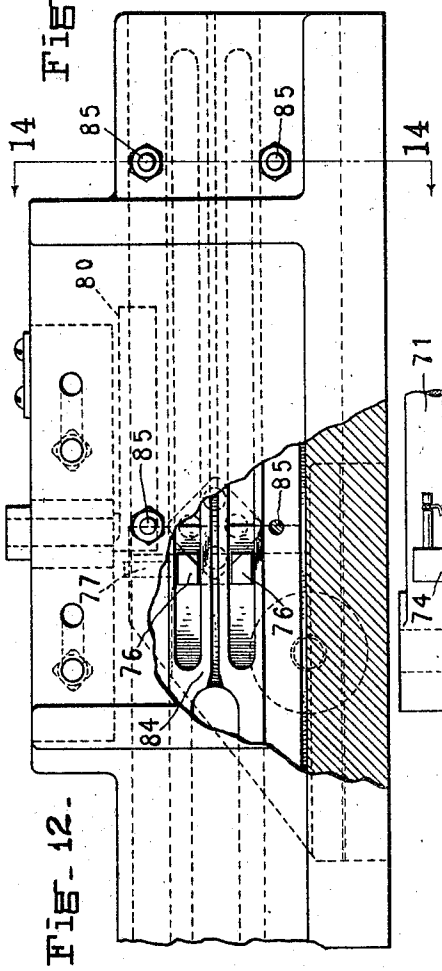

Fig. 12.

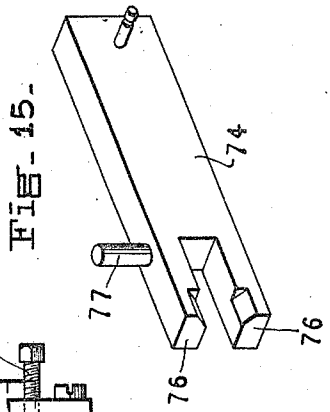

Fig. 15.

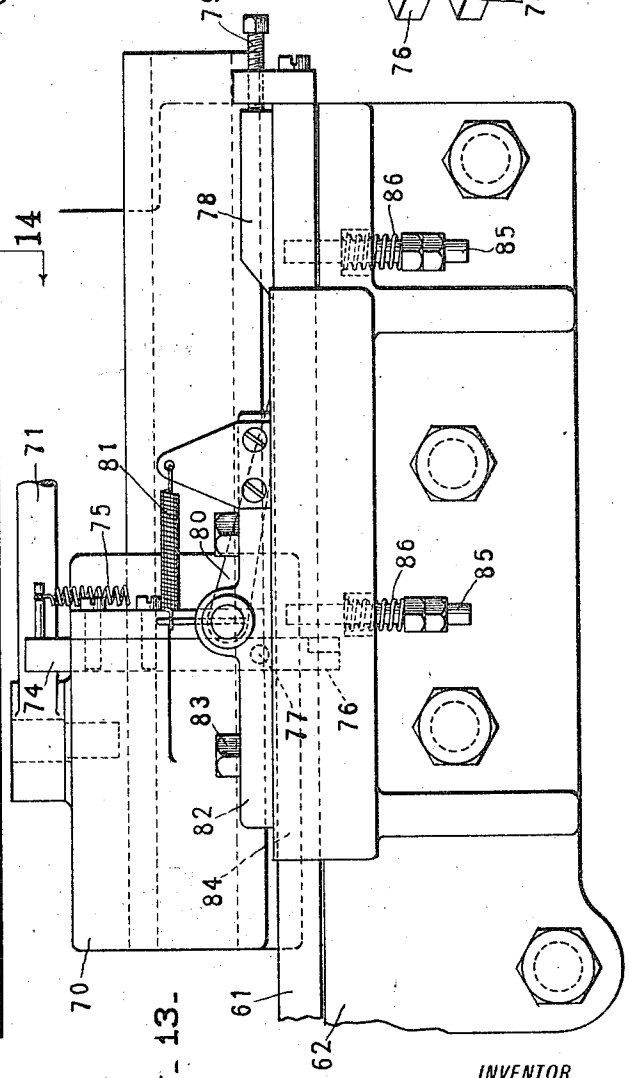

Fig. 13.

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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.

1,043,898. Specification of Letters Patent. Patented Nov. 12, 1912.

Application filed May 10, 1909. Serial No. 494,997. Renewed October 1, 1912. Serial No. 723,433.

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.

This invention relates particularly to mechanism for assembling wire links and perforated plates to form strands. These strands are often connected by cross links to form fabrics such for instance as are made into bed springs.

The plates as they come from the stamping machine in which they are formed are often somewhat rough and irregular and difficult to feed.

One of my objects is to supply these rough plates to the machine and feed them regularly.

Another object is to feed the links and automatically connect them to the plates.

Another object is to draw the strand along out of the machine.

To accomplish these results the rough plates are supplied in a sort of inclined trough at the bottom of which they are flattened and from which they are fed intermittently to the assembling position. The hooked links are supplied on a guide from which they are fed so as to hook into the rear end of the last plate of the strand already formed and into the front end of the plate just fed down from the supply trough. The hooks are then partially bent over and the strand fed along. At the next operation the hooks are closed down. Means are also provided for holding the plates in their proper positions during the operations.

The accompanying five sheets of drawings illustrate the details of one form of the invention.

Figure 1 is a plan view of the principal parts of a machine embodying the improvements of my invention. Fig. 2 is a side view and partial section of the same on the line 2—2 of Fig. 1. Fig. 3 is an end view of the same on a larger scale. Fig. 4 is a detailed side view of the device for retarding the plates in the feed chute. Fig. 5 is a side view and partial section showing the plate feeding and positioning mechanism. Fig. 6 is a cross sectional view of the plate supply trough. Fig. 7 is a perspective view of the plate feeding plunger. Fig. 8 is a transverse sectional view of the machine showing the assembling mechanism. Fig. 9 is a perspective view of one of the plate centering devices. Fig. 10 is a transverse section showing the link closing mechanism. Fig. 11 is a plan view of the closing dies. Fig. 12 is a side view with part broken away and showing the drawout or strand tension mechanism. Fig. 13 is a plan view of the same. Fig. 14 is a transverse section of the same, on the line 14—14 of Fig. 12. Fig. 15 is a perspective view of the plate engaging member of the drawout mechanism.

Plate supply.—The rough plates such as 1 are deposited in any suitable manner in the trough 2 which is inclined downward at an angle of 45° to the horizontal. This trough is open on one side and the edges of the plates are guided by two strips such as 3, 3. Leading forward from the lower end of trough 2 and downward at an angle of 90° thereto is a chute 4 which leads to the assembling position. This chute 4 is similar in construction to trough 2.

Plate flattening.—At the junction of the trough 2 and chute 4 is located a horizontally movable plunger 5 serving as a hammer to strike and flatten each plate as it passes from the trough into the chute. This hammer is normally retracted under the tension of spring 6 and is intermittently actuated between the feeding intervals of the plates. The pivoted lever 7 (see Fig. 3) carries the bolt 8 at the upper end which engages the rear of the hammer 5. This bolt is adjustable so as to vary the horizontal position of the hammer. The slide 9 is connected by rod 10 to the crank disk 11 on the main shaft 12 of the machine so that the slide is reciprocated once in each revolution of the main shaft. The block 13 having an inclined cam-like surface (shown dotted in Fig. 1) is secured to slide 9 by means of one or more bolts or screws such as 14 so that its position may be adjusted longitudinally of the slide. Throughout the greater portion of the stroke of the slide 9, the lower end of lever 7 rests on the long straight portion of block 13 and the hammer is held retracted. Just before the slide reaches its farthest position to the right (Fig. 1) the cam portion of the block 13 presses the lower end of lever 7 outwardly and thus throws the hammer to the right (Fig. 3) to flatten the plate which is then in position opposite it. I prefer to provide an anvil 15

shown dotted in Figs. 1 and 3 opposite the hammer and a bolt or set screw 16 for moving it to take up wear.

Plate feeding.—A plunger 17 carrying a thin projection or finger 18 slides in line with the chute 4 for intermittently feeding the plates down the chute after they have been flattened by the hammer. A bell-crank lever has one arm 19 connected to the plunger 17 and the other arm 20 depending above slide 9. The spring 21 normally holds this lever and the plunger 17 retracted in the position shown in Figs. 1, 2, 3 and 5. A pawl 22 is pivoted to arm 20 of the lever and normally pressed by spring 23 against the stop 24 on arm 20. The dog 25 is adjustably secured to slide 9 by means of one or more set screws on bolts such as 26, and in alinement with the pawl 22. Just before the slide 9 reaches the left hand end of its stroke (Figs. 1 and 2) the dog 25 engages pawl 22, rocks the bell-crank and moves plunger 17 so as to feed one plate down the chute 4. As the length of stroke of the feed plunger 17 is quite short compared to the length of stroke of slide 9 the parts are so proportioned that the pawl 22 is disengaged from the dog before the dog reaches the left hand end of its stroke. When the pawl is disengaged, the spring 21 throws the bell-crank lever and plunger 17 back to the position shown and allows another plate such as 1 to slide down the trough 2. On the return (right hand) stroke of the dog, it snaps under the pawl 22 which yields to permit it. Near the end of the chute 4 is a retarding device consisting of a shoe 27 which is pressed by means of a spring 28 into engagement with the plates as they are fed down the chute. This prevents the displacement of the next to the last plate in the chute and those above it when the bottom plate is drawn out of its position as hereinafter described. The pressure of the shoe need be only sufficient to hold the row of plates above in the chute and of course does not add materially to the force necessary to operate the feed plunger 17.

Plate positioning.—At the bottom of the feed chute 4 are a pair of pivoted members 30, 31 which I shall term guards which are pressed by means of springs 32, 33 respectively, into engagement with the front edges of the plate at the bottom of the chute (see Fig. 5). These guards bring the plates into and hold them in the assembling position but inasmuch as they are yielding they are readily forced apart when the plates are pulled along horizontally. Another pair of spring pressed guards 34, 35 is located at such a distance from the first pair of guards as to engage a plate when its left hand hole is at the proper distance from the right hand hole of the plate held by the first pair of guards. The pivots 36, 37 of these guards 34, 35 are horizontally adjustable in slots as shown in Fig. 5 to accommodate different lengths of links.

Link supply.—The links such as 40 are formed on suitable wire working machines into the shapes shown in Fig. 1. the ends being shaped so as to permit of the operations in this assembling machine. An upright member 41 serves to hold a column of a considerable number of these links and is shaped so as to permit the links to slide down readily to the assembling position.

Link feeding.—Opposite the lower end of the link guide 41 is located a slide 42 which is moved transversely to the direction of slide 9 by means of a lever 43 which has a roller 44 guided in a groove of cam 45 on the main shaft 12. This slide is thus reciprocated once in each rotation of the main shaft. The plunger for feeding the links is formed in two parts 46 and 47. The part 47 is clamped to block 47′ on the slide 42 by a bolt or set screw 48 so that it may be longitudinally adjusted to accommodate different lengths of links. Both parts 46 and 47′ are transversely adjustable as for instance by set screws or bolts such as 49 for the purpose of varying the feed of the links. When the slide 42 moves backward, the bottom link on guide 41 drops down in front of the plunger parts 46, 47. On the return or forward stroke the parts 46, 47 feed the link forward so that the bent ends pass through the corner holes of the plates held by the guards just described.

Assembling.—Adjacent the position of the two sets of guards before referred to and opposite the feed plungers 46, 47 are located two devices 50, 51 which perform the double function of centering and holding the plates and causing the ends of the links to be bent over and partially closed as they are fed through the holes in the plates (see Figs. 1, 5 and 8). Fig. 9 shows the right hand device 51. This device has two fingers 52, 52 for entering in the upper and lower holes of the plate held by guards 34, 35. The flat surface 53 engages the face of the plate. The fingers are inserted through the plate until the flat surface 53 engages the face of the plate and holds it rigid. A groove 54 having an inclined surface receives the end of the link 40 as it is fed forward and causes the end to be bent over into the form shown in plan view in Fig. 1. The device 50 is similar to 51 but reversed to accommodate the corresponding end of link 40. Both of these devices are secured to slide 55. This slide has a roller 56 which fits into a groove 57 in slide 9 so that when slide 9 is reciprocated as before described, slide 55 is moved transversely and the fingers of the devices 50, 51 are inserted into and retracted from the plates. Both of the devices 50 and 51 are adjustable transversely of the machine

by means of set screws or bolts such as 58. The right-hand device 51 is secured to an intermediate supporting block 51' by means of a bolt or set screw 59 so as to permit of its adjustment longitudinally of the machine to accommodate links of different lengths.

Strand guide.—After the links and plates are assembled to form the strand they are drawn to the right (see Fig. 1) as will be described later. The plates are guided in a vertical way 60 between the bars 61, 62 and the links are guided in a horizontal way 63 part of which is formed in each of the two bars 61, 62.

Link closing.—Just beyond the assembling mechanism are located the dies for completing the closing action of the links. The die 65 which serves as an anvil or abutment on one side of the strand guide is secured to the bed of the machine by one or more set screws such as 66 so that it may be longitudinally adjusted. It does not move transversely, however. Opposite this abutment are located the two closing dies 67, 68 (see Fig. 11) which are carried by a block 69 mounted on the slide 55 before referred to. These two dies 67 and 68 are both adjustable longitudinally in the same way that devices 51 and 65 are adjustable and for the same purpose. The faces of the dies 65, 67, 68 are preferably grooved as shown in Fig. 10, and indicated by dotted lines in Fig. 11 so as to insure the proper closing of the links. Block 69 with dies 67 and 68 may be adjusted by a set screw 69'.

Draw-out.—The action of the machine is intermittent. The flattening of the plates, the feeding and assembling of the links, and the closing of the hooks all occur substantially simultaneously, and then, while the tools for these operations are being retracted, the plates are fed down the chute 4 and the strand is drawn along the guide-way. The slide 70 is connected by eccentric rod 71 and strap 72 to an eccentric 73 on the main shaft 12 so that the slide 70 is reciprocated once in each rotation of the main shaft. A plunger 74 is carried by the slide 70 and is normally under tension of the spring 75. This plunger has two fingers 76, 76 adapted to engage behind the edges of a plate as shown in Figs. 2 and 12 so that as the slide 70 is drawn to the right the strand is moved with it. The pin 77 projects from plunger 74 and opposite thereto is the knock-out block 78 having its left hand end inclined. When the pin 77 engages the face of the knock-out 78 the plunger 74 is retracted and fingers 76, 76 disengaged from the plate of the strand so as to stop the feeding of the strand. The knock-out is adjustable by means of a bolt or set screw 79 so as to limit the feeding operation of the stroke according to the length of link employed. It is thus possible to obtain the desired effective stroke without changing the stroke of the slide 70. The pivoted inclined arm 80 is under the tension of the spring 81 and yields as the pin 77 passes to the right during the feeding stroke. On the return stroke the pin 77 rides up the incline of the arm 80 so as to pass over the plate which has been drawn into position by the last feeding stroke. As the slide 70 and plunger 74 reach approximately the left hand limit of the stroke the pin 77 snaps down from the left hand end of the inclined arm 80 back of the plate preparatory to the next feeding stroke. The arm 80 is carried by the frame 82 which is secured to the bed of the machine by means of one or more bolts such as 83 so that the frame and the retracting arm 80 may be longitudinally adjusted to permit the release of pin 77 and the feed plunger 74 at the proper position. Opposite the bar 62 which forms a part of the strand guide and adjacent the drawout plunger is located a shoe 84. A series of threaded posts such as 85, 85 are carried by the shoe 84 and extended through openings in the bar 62. On these posts are arranged springs such as 86, 86 for drawing the shoe 84 toward the bar 62 and thus producing pressure upon the strand so as to hold the strand in position properly during the drawout movement and during the return stroke of the feed plunger 74. The tension of the springs is not sufficient however to add materially to the power required to draw out the strand.

Operation.—The perforated plates are placed in the inclined trough on edge with one of their corners uppermost. They slide down this trough to the chute and as each plate reaches the junction of the trough and chute, it is flattened by the hammer and then pushed down the chute by the feed plunger. The hammer and its operating mechanism are adjustable for different thicknesses of plates and for taking up wear. Near the bottom of the chute the friction shoe retards the plates so that they are maintained in their proper positions. At the bottom of the chute the first pair of guard devices holds a plate in position for assembling at one end of the strand guide. The second pair of guards holds a plate in the strand guide at a distance from the first plate so that the adjacent corner holes of the plates positioned by the two pairs of guards will be equal to the distance between the ends of the partially formed links. A link is then fed from the bottom of the link guide to engage the front hole of the plate at the bottom of the chute and the rear hole of the plate held by the second pair of plate guards.

The centering devices, arranged opposite the link guide, are inserted in the upper and lower holes of the two positioned plates and center the plates accurately so that the ends of the link being fed from the link

guide will properly enter the adjacent corner holes. As the ends of the link are fed through the plate holes they are bent over partially by coming in contact with inclined faces of the centering devices. Just beyond the assembling mechanism the closing devices act upon the links as they are fed along so as to completely close the hooks. The second centering device and the second pair of plate guards and both of the closing devices are longitudinally adjustable to accommodate different lengths of links. For similar reasons the device for feeding the links from the link supply guide is divided into two parts one of which is longitudinally adjustable. After the links have been closed upon the plates the drawout mechanism engages each plate and pulls the strand along intermittently. The knockout device disengages the drawout fingers at the end of the feed stroke. This knockout device may be adjusted so as to vary the length of the effective stroke. On the return stroke of the drawout fingers they are retracted so as to pass by the next strand plate. The position of the retractor is also longitudinally adjustable so as to vary the time of engagement of the drawout fingers for different lengths of links. The links and plates of the strand are held by the friction shoe in the strand guide so as to prevent displacement and insure proper action of the drawout mechanism.

What I claim is:—

1. A stranding machine, comprising means for supplying plates, means for feeding them, means for flattening them, means for supplying links, means for feeding links to engage the plates, means for partially bending the link hooks, means for closing the link hooks, and means for drawing out the strand.

2. A stranding machine, comprising means for supplying plates, means for feeding them, means for supplying links, means for feeding links to engage the plates, means for partially bending the link hooks, means for closing the link hooks, and means for drawing out the strand.

3. A stranding machine, comprising means for supplying plates, means for feeding them, means for flattening them, means for supplying links, means for feeding links to engage the plates, means for closing the link hooks, and means for drawing out the strand.

4. A stranding machine, comprising means for supplying plates, means for feeding them, means for supplying links, means for feeding links to engage the plates, means for closing the link hooks, and means for drawing out the strand.

5. A stranding machine, comprising means for supplying plates, means for flattening them, means for supplying links, means for feeding links to engage the plates, means for partially bending the link hooks, means for closing the link hooks, and means for drawing out the strand.

6. A stranding machine, comprising means for supplying plates, means for supplying links, means for feeding links to engage the plates, means for partially bending the link hooks, means for closing the link hooks, and means for drawing out the strand.

7. A stranding machine, comprising means for supplying plates, means for flattening them, means for supplying links, means for feeding links to engage the plates, means for closing the link hooks, and means for drawing out the strand.

8. A stranding machine, comprising means for supplying plates, means for supplying links, means for feeding links to engage the plates, means for closing the link hooks, and means for drawing out the strand.

9. In a stranding machine, an inclined trough for supplying plates on edge, means for flattening the plates, means for feeding the plates at right angles from the trough, and means for attaching links to the plates.

10. In a stranding machine, an inclined trough for supplying plates on edge, means for feeding the plates at right angles from the trough, and means for attaching links to the plates.

11. In a stranding machine, an inclined trough for supplying plates on edge, means for flattening the plates, means for feeding the plates from the trough, and means for attaching links to the plates.

12. In a stranding machine, an inclined trough for supplying plates on edge, means for feeding the plates from the trough, and means for attaching links to the plates.

13. In a stranding machine, a guide trough for guiding the edges of plates, means for flattening the plates, means for feeding the plates, and means for attaching links to the plates.

14. In a stranding machine, means for flattening the plates, means for feeding the plates, and means for attaching links to the plates.

15. In a stranding machine, an inclined chute, means for feeding plates down said chute, means for flattening the plates, and means for attaching links to the plates.

16. In a stranding machine, an inclined chute, means for feeding plates down said chute, and means for attaching links to the plates.

17. In a stranding machine, means for supplying plates, means for feeding and attaching links, means for flattening the plates, and means for drawing out the strand.

18. In a stranding machine, means for

guiding rough plates, means for flattening them, means for attaching hooked links to the plates, and means for closing the hooks.

19. In a stranding machine, an inclined plate-supply trough, an inclined feed chute leading therefrom at an angle thereto, means for flattening a plate while at the junction of the trough and chute, means for feeding plates down the chute, a strand guide, means for attaching a hooked link to the front of a plate at the end of the chute and to the rear of a plate in said guide, and means for closing the hooks.

20. In a stranding machine, an inclined plate-supply trough, an inclined feed chute leading therefrom at an angle thereto, means for feeding plates down the chute, a strand guide, means for attaching a hooked link to the front of a plate at the end of the chute and to the rear of a plate in said guide, and means for closing the hooks.

21. In a stranding machine, an inclined plate-supply trough, an inclined feed chute leading therefrom at an angle thereto, and means for feeding plates down the chute.

22. In a stranding machine, an inclined plate-supply trough, an inclined feed chute leading therefrom at an angle thereto, means for flattening a plate while at the junction of the trough and chute, means for feeding plates down the chute, and means for attaching hooked links.

23. In a stranding machine, means for flattening a plate while at the junction of the trough and chute, means for feeding plates down the chute, and means for attaching hooked links.

24. In a stranding machine, means for feeding plates, and means for attaching a hooked link to two plates at once.

25. In a stranding machine, means for feeding plates, means for attaching a hooked link to two plates at once, and means for intermittently drawing out the strand.

26. In a stranding machine, means for feeding plates, means for centering two plates spaced apart from each other, and means for inserting the hooks of a link in said plates.

27. In a stranding machine, means for feeding plates, means for centering two plates spaced apart from each other, means for inserting a hooked link, and means for bending said hooks.

28. In a stranding machine, means for feeding plates, means for centering two plates spaced apart from each other, means for inserting a hooked link, means for bending the hook, and means for closing said hooks.

29. In a stranding machine, an inclined chute, and spring-pressed devices for positioning a plate at one end of said chute.

30. In a stranding machine, means for feeding plates on edge, and a horizontally acting hammer to flatten said plates.

31. In a stranding machine, means for feeding square plates with one diagonal horizontal, and means for feeding links horizontally to engage said plates.

32. In a stranding machine, a strand guide means for applying plates thereto, and means for feeding links from one side with the direction of their length parallel to the direction of length of said guide.

33. In a stranding machine, a horizontal strand guide for guiding a strand with the plates on edge, and means for feeding links horizontally so as to engage a pair of plates from the side.

34. In a stranding machine, a horizontal strand guide, plate centering devices, and link feeding means.

35. In a stranding machine, a horizontal strand guide, plate centering devices, and link feeding means, and means for drawing out the strand.

36. In a stranding machine, a strand guide having a vertical groove for the plates and a horizontal groove for the links, and means for drawing a strand through said guide.

37. In a stranding machine, a strand guide, means for holding a plate at one end of said guide, means for holding a plate spaced apart therefrom, and means for inserting the hooks of a link in the plates while so held by said means.

38. In a stranding machine, a strand guide, means for feeding plates to said guide, means for holding a plate at one end of said guide, means for holding a plate spaced apart therefrom, and means for inserting the hooks of a link in the plates while so held by said means.

39. In a stranding machine, a plate supply trough, a chute leading at right angles therefrom, means for flattening a plate at the junction of the trough and chute, and means for feeding plates in the chute.

40. In a stranding machine, a plate supply trough, a chute leading at right angles therefrom, and means for feeding plates in the chute.

41. In a stranding machine, a plate supply trough, a chute leading at right angles therefrom, means for feeding plates in the chute, and means for retarding the plates in the chute.

42. In a stranding machine, a plate supply trough, a chute leading at right angles therefrom, means for feeding plates in the chute, and a pair of guard devices to position the plate at the bottom of the chute.

43. In a stranding machine, a plate supply trough, a chute leading at right angles therefrom, means for feeding plates in the chute, means for retarding the plates in the

chute, and a pair of guard devices to position the plate at the bottom of the chute.

44. In a stranding machine, an inclined chute, means for feeding plates down the chute, means for retarding plates in the chute, and means for inserting a link in the bottom plate.

45. In a stranding machine, two pairs of movable guards for positioning plates, a plate centering and holding device adjacent each pair of guards, means for moving said devices to engage the plates, and means for inserting the hooks of a link in the plates while so engaged.

46. In a stranding machine, two pairs of movable guards for positioning plates, a plate centering and holding device adjacent each pair of guards, means for moving said devices to engage the plates, means for inserting the hooks of a link in the plates while so engaged, and means for drawing out the strand.

47. In a stranding machine, plate feeding means, two pairs of yielding guards for positioning two plates, means for feeding a link to insert its ends in the plate holes, and means for drawing out the strand.

48. In a stranding machine, plate feeding means, two pairs of yielding guards for positioning two plates, means for feeding a link to insert its ends in the plate holes, means for bending the link hooks, and means for drawing out the strand.

49. In a stranding machine, plate feeding means, two pairs of yielding guards for positioning two plates, one of said pairs of guards being adjustable, means for feeding a link to insert its ends in the plate holes, and means for drawing out the strand.

50. In a stranding machine, plate feeding means, means for inserting a hooked link, dies for partially bending the hooks, dies for closing the hooks, a common slide carrying said bending and said closing dies, and means for drawing out the strand.

51. In a stranding machine, plate feeding means, a link supply guide, means for feeding a link from said guide, said link feeding means including a plunger formed in two parts, one part being adjustable relative to the other part.

52. In a stranding machine, plate feeding means, link feeding means, and two centering devices, one being adjustable relative to the other.

53. In a stranding machine, plate feeding means, link feeding means, means for partially bending the link hooks, and means for closing the hooks, said closing means being adjustable relative to the first bending means.

54. In a stranding machine, plate feeding means, flattening means, centering means, and a single slide operating all of said means.

55. In a stranding machine, means for holding two square perforated plates with their diagonals in alinement and means for inserting the hooks of a link into the adjacent perforations of the plates.

56. In a stranding machine, means for holding two square perforated plates with their diagonals in alinement, means for inserting the hooks of a link into the adjacent perforations of the plates, and means for closing the hooks.

57. In a stranding machine, a strand guide having walls to hold flat plates on edge, means for assembling perforated plates and hooked links, and means for drawing the strand through the guide.

58. In a stranding machine, means for holding two square perforated plates with their diagonals in alinement, and means for feeding a hooked link and inserting the hooks into the adjacent perforations of the plates.

59. In a stranding machine, means for holding two square perforated plates with their diagonals in alinement, means for inserting the hooks of a link into the adjacent perforations of the plates, and pressure devices for closing the hooks.

60. In a stranding machine, a strand guide having walls to hold flat plates on edge, means for inserting the hooks of hooked links in the perforations of the plates, and means for drawing the formed strand through the guide.

61. In a stranding machine, a trough for guiding somewhat dished or warped plates, a hammer device for flattening said plates, and a guide chute for the flattened plates.

62. In a stranding machine, a grooved strand guide, means for holding a perforated plate with two of its perforations in alinement with the groove, and means for engaging a link with one of the perforations of said plate.

63. In a stranding machine, an inclined plate guide, a horizontal strand guide, and means for feeding a hooked link to connect two perforated plates.

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Witnesses:
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