A. RHENSTROM & H. F. HAGER.

WIRE LINK FABRIC CLOSING MACHINE.

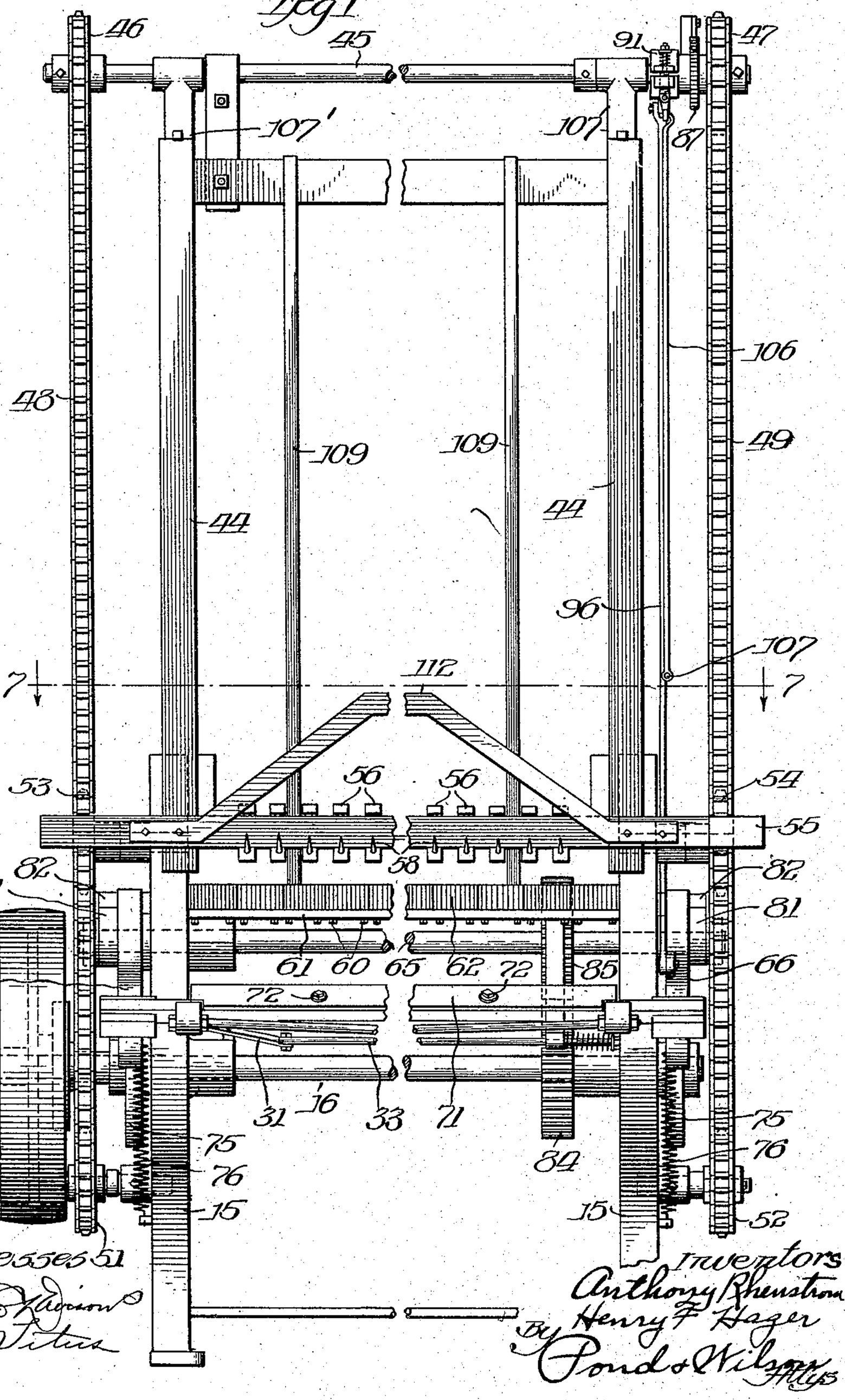
APPLICATION FILED NOV. 7, 1914.

1,166,633.

Patented Jan. 4, 1916.

4 SHEETS—SHEET 1.

Fig 1



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4 SHEETS—SHEET 2.

Fig. 2

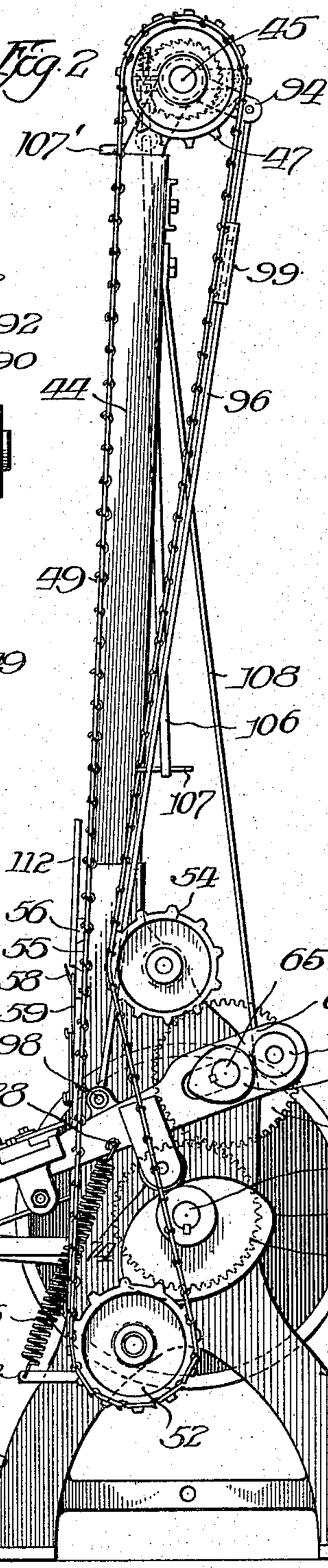

Fig. 3

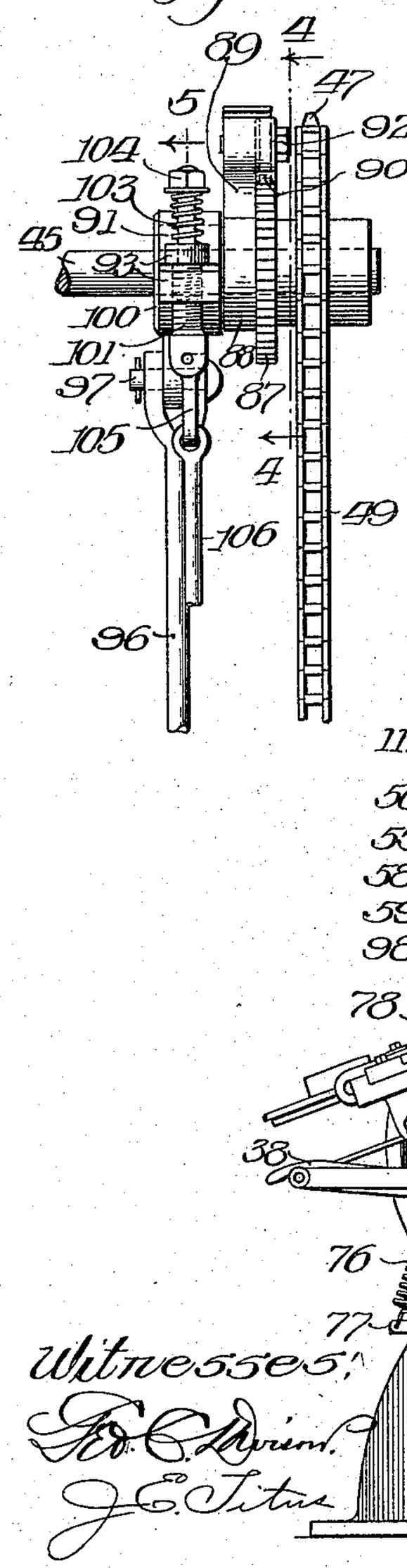

Fig. 5.

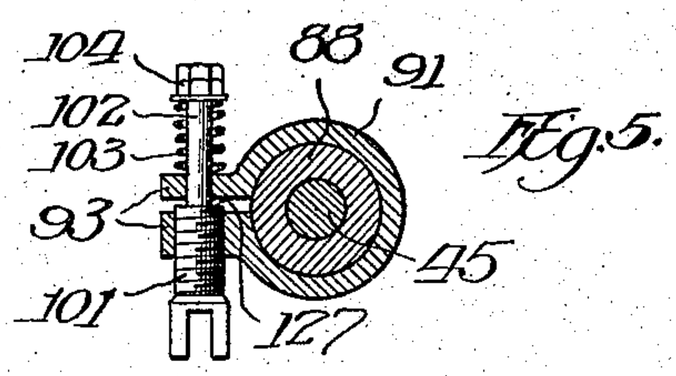

Fig. 4

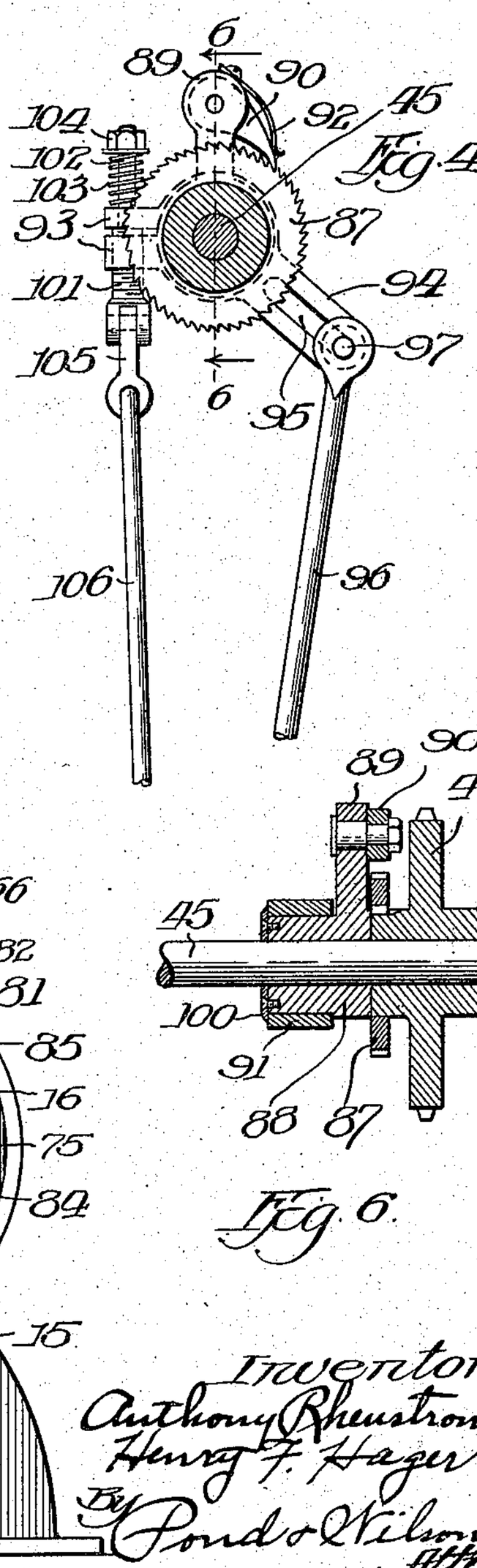

Fig. 6.

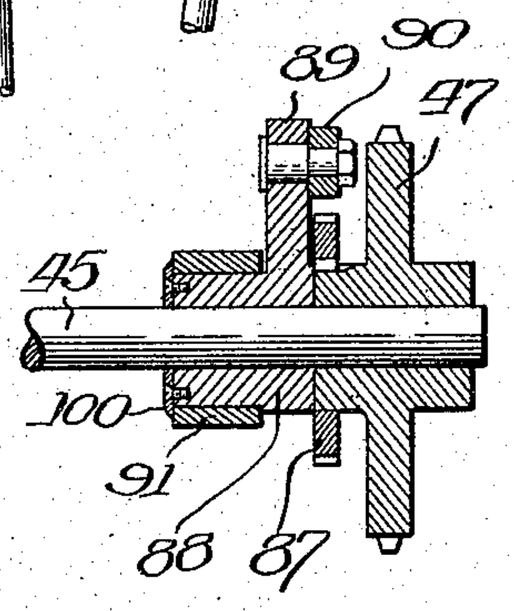

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Fig. 7

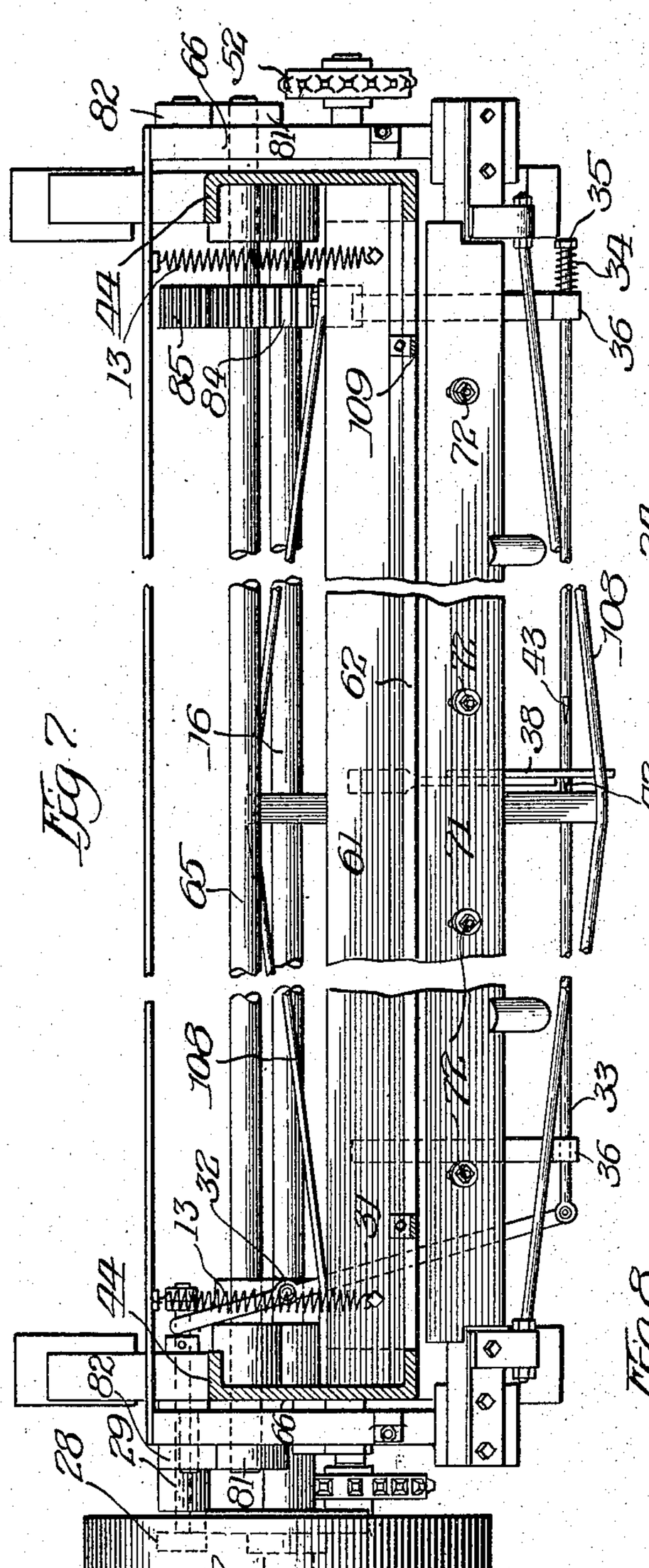


Fig. 9

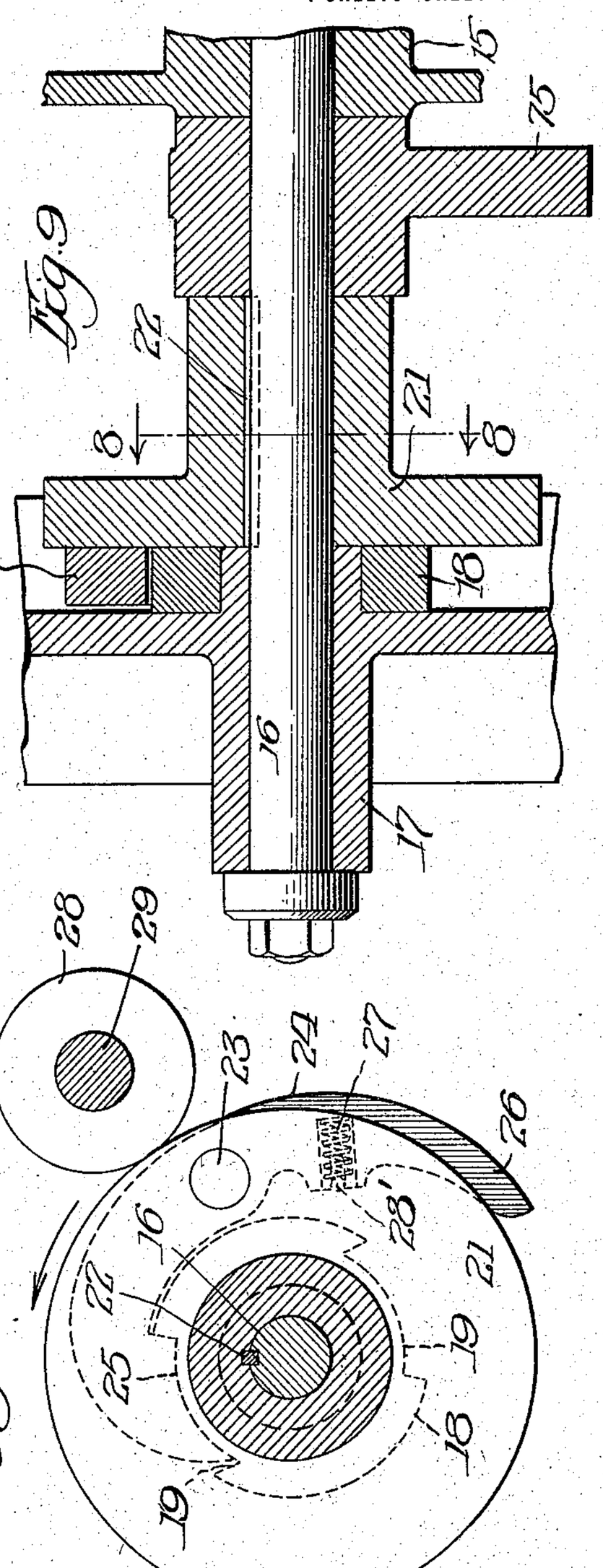
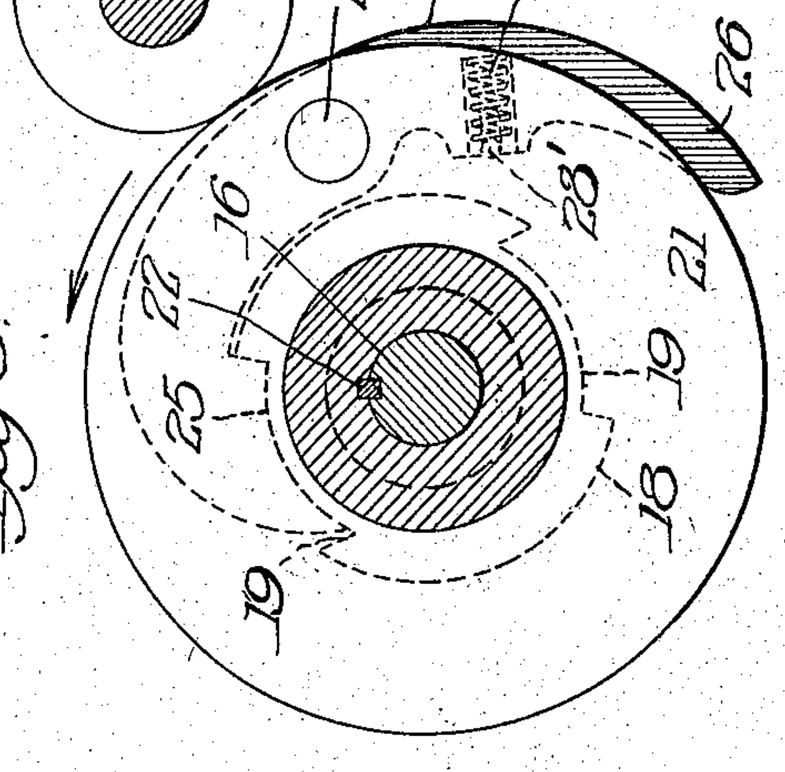


Fig. 8.



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4 SHEETS—SHEET 4.

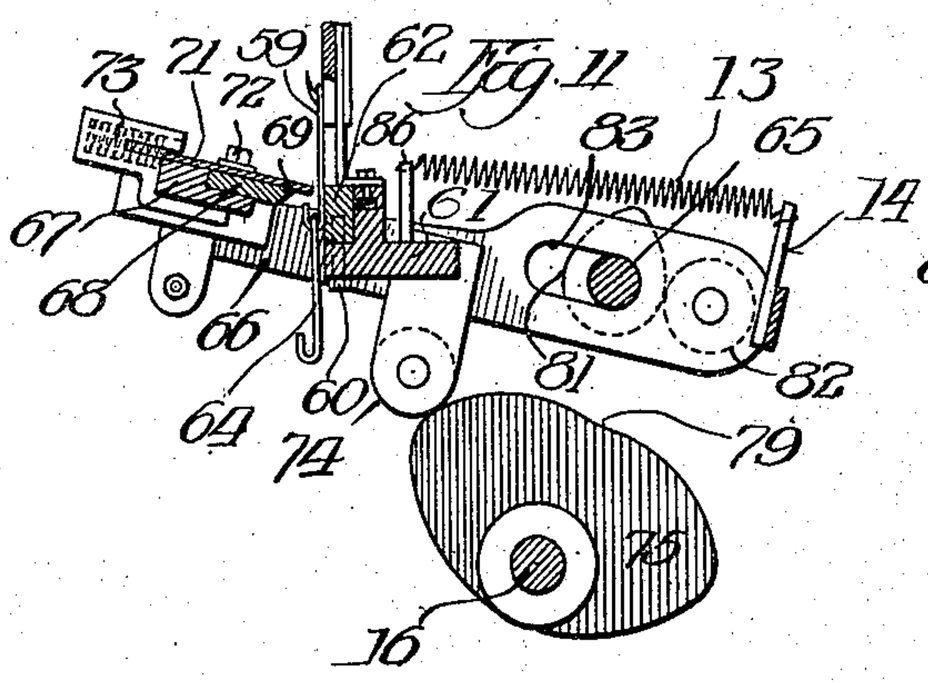

Fig. 11

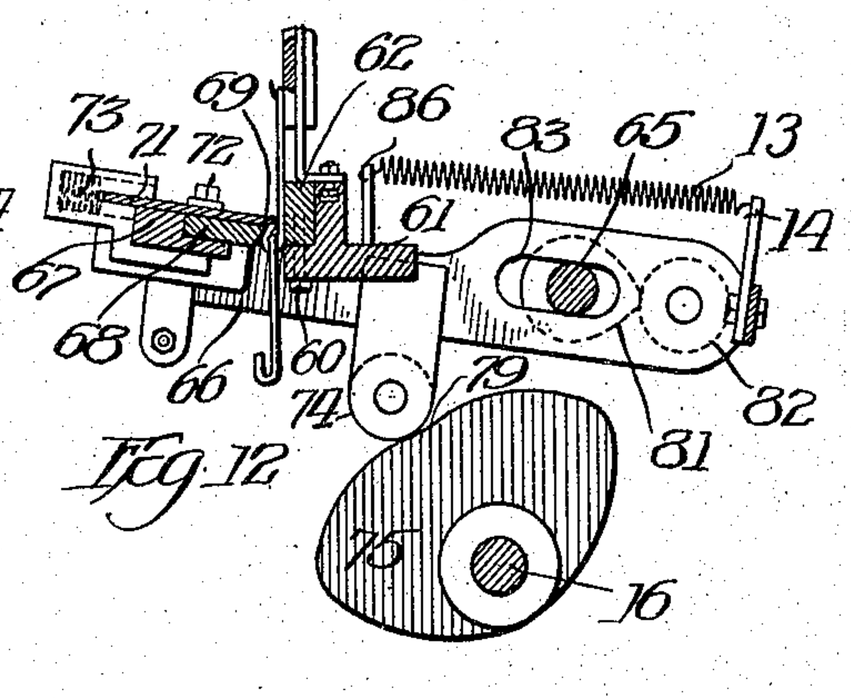

Fig. 12

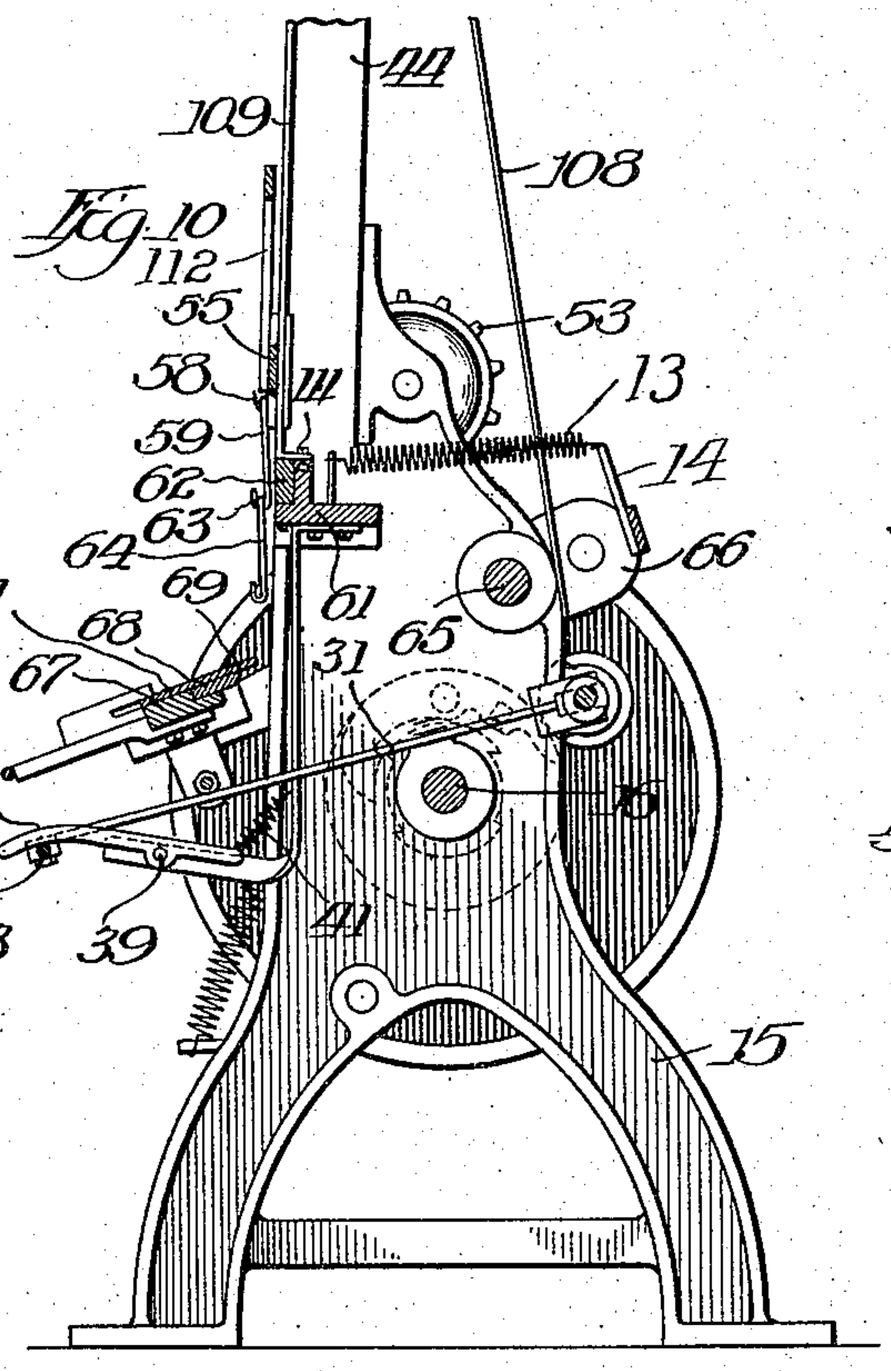

Fig. 10

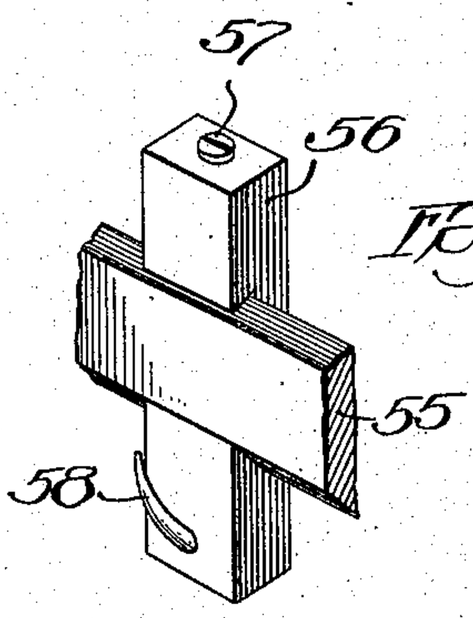

Fig. 13

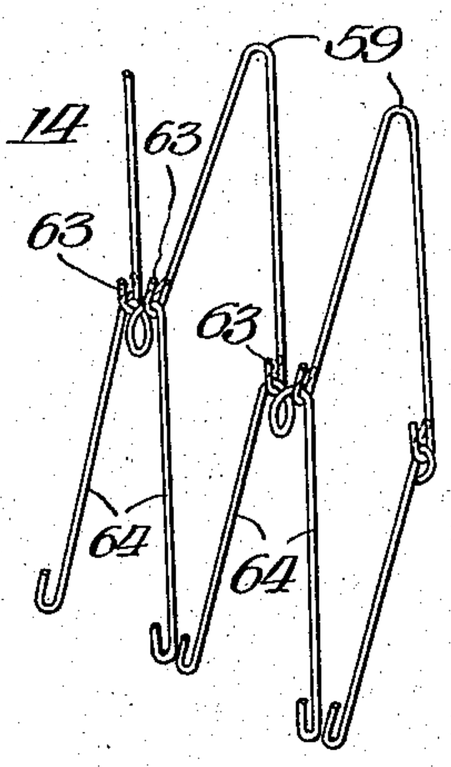

Fig. 14

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UNITED STATES PATENT OFFICE.

ANTHONY RHENSTROM, OF KENOSHA, WISCONSIN, AND HENRY F. HAGER, OF CHICAGO, ILLINOIS, ASSIGNORS TO LIPPERT & RHENSTROM, A COPARTNERSHIP CONSISTING OF ALOYSIUS C. LIPPERT AND ANTHONY RHENSTROM, OF KENOSHA, WISCONSIN.

WIRE-LINK-FABRIC-CLOSING MACHINE.

1,166,633. Specification of Letters Patent. Patented Jan. 4, 1916.

Application filed November 7, 1914. Serial No. 870,773.

To all whom it may concern:

Be it known that we, ANTHONY RHENSTROM, a citizen of the United States, residing at Kenosha, in the county of Kenosha and State of Wisconsin, and HENRY F. HAGER, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Wire-Link-Fabric-Closing Machines, of which the following is a specification.

This invention relates in general to wire working machines and has more particular reference to machines for making wire fabrics such as are customarily used for bed bottoms and on sanitary couches, davenports and the like, the present machine being designed to close the hooked ends of the links of which the fabric is composed so as to lock the links securely together.

One of the primary objects of this invention is the provision of a machine which will hold a row of fabric links with the hooked ends in convenient position to receive the links of the next row to be assembled, and which will automatically close the hooks of the entire row of links and will then advance the assembled links a predetermined distance to bring the hooks of the succeeding row into the desired position.

Another object of the invention, is to provide a machine which will aline and properly position the links so that the hooks will be in proper position to be operated upon by the closer and uniformly closed.

Another object is to provide mechanism for operating the closer which will be positive and accurate in its operation, which will be simple in construction and easy to manipulate so that the machine can be operated with a minimum expenditure of power.

A further object is to provide novel mechanism for automatically advancing the assembled fabric a distance equal to the length of a single link after each closing operation and also to provide novel means for controlling the operation of the machine.

Other objects and advantages of this invention will be apparent as the same becomes better understood by reference to the following description when considered in connection with the accompanying drawings.

Referring to the drawings,—Figure 1 is a front elevation of a machine embodying my invention; Fig. 2 is an end elevation looking toward the left at the machine shown in Fig. 1; Fig. 3 is an enlarged detail view of the mechanism for advancing the assembled fabric step-by-step; Fig. 4 is a sectional view on the line 4—4 of Fig. 3; Fig. 5 is a sectional view on the line 5—5 of Fig. 3; Fig. 6 is a sectional view on the line 6—6 of Fig. 4; Fig. 7 is a transverse sectional view on the line 7—7 of Fig. 1; Fig. 8 is a sectional view taken on the line 8—8 of Fig. 9; Fig. 9 is a fragmentary sectional view taken on the line 9 of Fig. 7; Fig. 10 is a fragmentary transverse sectional view taken substantially medially of the machine; Fig. 11 is a detail view showing the position of the parts just prior to the closing operation; Fig. 12 is a similar view, showing the position of the parts at the completion of the closing operation; Fig. 13 is a detail perspective view of one of the link-supporting blocks; and Fig. 14 is a fragmentary view of the fabric.

On the drawings reference character 15 indicates the main frame of the machine upon which the various operating parts, to be later described, are carried. A main shaft 16, journaled in the frame, is provided at one end with a pulley 17 loosely mounted thereon through which power is applied to the machine by a belt from any suitable source of power. A clutch member 18 (Figs. 8 and 9) provided with a plurality of notches or depressions 19 is fixed on the hub of the pulley 17 to rotate therewith. A disk 21 secured on the shaft 16 by a key 22 has pivotally mounted on a pin 23 projecting from its outer face a dog or clutch member 24 shaped at one end, as indicated at 25, to engage in the notches 19 and formed at its other end to provide a tail 26 adapted, when the dog is engaged with a notch 19 as shown in Fig. 8, to project beyond the periphery of the disk 21. An expansion spring 27 disposed in a recess formed in the dog 24 and abutting at its inner end against a pin or other form of abutment 28′ projecting from the disk, normally urges the dog into the operative position shown in Fig. 8 to thereby lock the pulley to the shaft 16.

A roller 28 carried on the outer end of a longitudinally movable rod or shaft 29 mounted in the main frame is normally disposed in radial alinement with the dog 24 so

that when the shaft 16 completes a revolution the tail 26 of the dog will be depressed by the roller to disengage the opposite end of the dog from the clutch member 18, thereby permitting the pulley to run idly on the shaft. A lever 31 pivoted at 32 is connected at one end with the rod 29 and at its other end with an operating rod 33 extending transversely of the machine in position to be grasped by the operator and moved longitudinally. The rod is normally held in the position shown in Fig. 7 by an expansion spring 34 disposed between the nut 35 on the end of the rod and one of the rod-carrying brackets 36 so that the roller 28 is in position to release the clutch and maintain the same in released position. In order to prevent accidental movement of the rod 33 we have provided a latch 38 (Fig. 10), pivoted at 39 and urged into engagement with the rod 33 by means of a contraction spring 41. The rod 33, as shown in Fig 7, is provided with a notch 42 into which the latch 38 enters to thereby lock the rod against movement. The rod 33 is also provided with a second notch 43 into which the latch 38 will fall before the clutch is released upon movement of the rod 33 to the left (viewing Fig. 7) unless the operator holds the latch in raised position with one hand while he manipulates the rod 33 with the other. This construction insures the use of both hands of the operator in moving the roller 28 from engagement with the dog 24 and prevents accidents to the operator, such as might happen if one hand were free to be caught by the closing mechanism. By raising the latch 38 and moving the rod 33 to the left the roller 28 is withdrawn from engagement with the dog 24, permitting the pulley 17 to be clutched to the shaft 16. As soon as the rod 33 is released the spring 34 returns the roller 28 into the path of the dog 24 which is thereupon disengaged from the clutch member 18 when the shaft completes one revolution.

A frame 44 rising substantially vertically from the main frame 15 is provided with suitable journals at its upper end in which a shaft 45 is rotatably mounted. Sprocket wheels 46 and 47 fixedly mounted on the ends of said shaft are connected by endless chains 48 and 49 with sprocket wheels 51 and 52 respectively, mounted upon stub shafts projecting laterally from the main frame. Suitable idlers 53 and 54 are mounted on the frame to engage the rear laps of the chains 48 and 49 for the purpose of diverting the chains away from other operating parts of the machine.

Secured to the front laps of the chains 48 and 49 in substantially horizontal position is a bar 55 which extends transversely across the machine and is adapted to carry a plurality of blocks 56 slidably mounted on the bar, as shown in Fig. 13. Each block is equipped with a set screw 57 by means of which the block may be locked in adjusted position on the bar, and is also provided on its forward face near the lower end thereof with a forwardly and upwardly projecting hook 58. The links 59 of the first row are suspended from these hooks 58 with their hooked ends downwardly and the blocks are adjustable on the bar 55 in order to accommodate them to links of various widths, depending upon the style of the particular fabric to be assembled.

An anvil comprising a rigid substantially T-shaped member 61 upon which a series of anvil blocks 62 are secured by means of bolts 60, is mounted on the frame 15 at the lower end of the upright frame 44. The anvil blocks which are preferably of hardened steel are provided on their forward or operating faces with vertically disposed corrugations which serve to prevent sliding or slipping of the links longitudinally of the anvil when they are compressed by the closer, as will be later described. When the fabric is to be started a link 59 is suspended from each of the hooks 58 and the bar 55 is positioned to bring the open hooks 63 of the suspended links directly in front of and in proximity to the front face of the anvil. A second row of links 64 is then suspended from the hooks 63 of the first row, as shown in Fig. 14, this second row of links being engaged with the hooks of the first row either by hand or by suitable feeding and positioning mechanism. After the entire second row of links has been positioned upon the hooks of the first row these hooks are closed or bent from the position shown in full lines to the position shown in dotted lines in Fig. 14, by mechanism which will now be described.

A secondary shaft 65 is mounted in the main frame rearwardly and above the main shaft 16 and upon this shaft is pivotally supported a pair of arms 66 carrying at their forward ends a closing bar consisting of a main portion 67 and a hardened portion 68 having an inclined rear closing face 69. A plate 71 is slidably secured by bolts 72 upon the upper face of this bar and expansion springs 73 situated in suitable sockets in front of the plate 71 normally urge the plate rearwardly so that its rear edge projects over the corresponding edge of the closing bar, as shown in Figs. 10, 11 and 12. Each arm 66 carries a cam follower or roller 74 which rests upon a corresponding cam 75 fixed on the main shaft 16. The cams 75 at opposite sides of the machine are identical so that the raising and lowering movements imparted to the arms 66 by the cams upon rotation of the shaft 16 are alike and both ends of the closing bar receive the same movement. The followers are held in con-

tact with their respective cams by means of coiled contraction springs 76 attached at 77 to arms fixed on the main frame and at 78 to the arms 66. The closing bar is normally maintained in lowered inoperative position, as shown in Fig. 2, the followers 74 resting upon the low parts of the cams 75. Rotation of the cams in a counter-clockwise direction, (viewing Figs. 2, 11 and 12) will first elevate the closing bar to the position shown in Fig. 11. Each cam 75 is provided on its high portion with a depression 79 which permits a slight downward movement of the closing bar so that the hooks 63 of the row of links to be closed are engaged by the projecting edge of the plate 71 and pulled downwardly a limited distance to aline all of the hooks and place them in proper position to be closed by the inclined closing edge 69 of the closing bar.

For the purpose of imparting a rearward movement to the closing bar toward the operating face of the stationary anvil to thereby compress the ends of the link hooks into the closed position shown in Fig. 12 and also in dotted lines in Fig. 14 we have provided mechanism which will now be described. The shaft 65 has fixedly mounted thereon a pair of cams 81 in proximity to the arms 66 adapted to coöperate with followers 82 in the shape of rollers mounted on the rear ends of the arms 66 to move the arms longitudinally into rearward direction. It will be apparent from an inspection of the drawings that each of the arms is provided with a longitudinally disposed slot 83 loosely embracing the shaft 65 so that the arms are capable not only of a pivotal movement about the shaft 65 but are also capable of a longitudinal movement transversely of the shaft. The shaft 65 is driven from the shaft 16 through the intermediary of intermeshing gear wheels 84 and 85 of equal diameter. Each time the depressed portions 79 of the cams 75 are brought beneath the followers 74 the high portions of the cams 81 are moved into engagement with the followers 82 to thereby impart a rearward longitudinal movement to the arms 66, forcing the closing bar against the hooked ends of the links. During the closing movement of the closing bar the plate 71, which has previously performed the function of alining the link hooks, is forced forwardly against the action of the spring 73 relatively to the closing bar, thus permitting the closing bar to press the link hooks against the stationary anvil into closed position. Continued movement of the cams 75 will first elevate the closing bar away from the hooks and then permit the bar to return to its normal inoperative position shown in Fig. 2. The arms 66 will in the meantime, after the high portions of the cams 81 have passed the followers 82, be moved forwardly on the shaft 65 by the contraction springs 13 attached at one end to fingers 14 projecting upwardly from the rear ends of the arms 66 and attached at their other ends to pins 86 fixed on the stationary anvil. It will thus be manifest that at each operation of the closing bar the link hooks are first properly alined against the forward face of the anvil and are then compressed between the anvil and the closing bar into closed position, all of the links of the row being closed simultaneously.

After each closing operation it is desirable to move the assembled links upwardly a distance equal to the length of a link so that the hooks of the next succeeding row will be brought into position to be closed upon the next actuation of the closing bar. The mechanism for advancing the assembled links a predetermined distance after each closing operation will now be described. Referring more particularly to Figs. 1 to 6 inclusive, it will be observed that the hub of the sprocket wheel 47 has fixedly mounted thereon a ratchet wheel 87. Adjacent to the inner face of the ratchet wheel there is loosely mounted upon the shaft 45 a hub 88 having an integral radially projecting arm 89 carrying at its outer end a pawl 90 which is maintained in coöperative relation with the teeth of the ratchet wheel 87 by means of a spring 92. A split ring friction member 91 loosely embraces the hub 88 and is held in position on the hub by a plate or disk 100. The split portion of the ring 91 terminates in lateral extensions 93 and the opposite side of the ring is provided with an arm 94 having a longitudinally extending slot 95. A rod 96 bifurcated at its upper end as shown in Fig. 3 is attached to the arm 94 by means of a pin 97 passing through the slot 95. The lower end of arm 96 is attached at 98 to one of the arms 66 so that this rod will be reciprocated longitudinally at each operative movement of the closing bar. A turnbuckle 99 is preferably interposed in the rod 96 intermediate its ends by means of which the length of the rod may be adjusted. The lower one of the extensions 93 is adapted to receive the threaded bolt 101 which has a smaller unthreaded portion 102 extending through the upper extension 93, and a coiled expansion spring 103 surrounding the portion 102 and interposed between the upper extension 93, and a nut 104 normally urges the extensions 93 toward each other to cause a frictional engagement between the ring 91 and the hub 88. The lower end of the bolt 101 is swivelingly connected by a link 105 to an operating rod 106 having a handle 107 at its lower end in convenient reach of the operator and by means of which the bolt may be turned. When the machine is in operation the bolt is partially unscrewed from the

lower extension 93 to permit the ring 91 to be frictionally clamped to the hub 88 by the spring 103. The arm 94 is thereby rigidly connected with the arm 89 carrying the pawl 90, and it will be obvious that at each oscillation of the arms 66 carrying the closing bar the shaft 45 will be given a partial rotation through the instrumentality of the pawl 90 operating upon the ratchet wheel 87. The movement of the shaft will, of course, take place during the downward or return movement of the arms 66 so that after each closing operation the sprocket wheels 46 and 47 will be rotated a sufficient distance to move the link-supporting bar 55 upwardly on the frame the requisite distance to position the succeeding row of link hooks in proper relation to the anvil. Another row of links is then engaged with the hooks of the second row, these hooks are then closed by the closing bar and the assembled links are advanced another step. These operations are repeated until the entire fabric is assembled. When the bar 55 reaches the upper end of the frame 44 it strikes against an abutment 107′ which precludes further feeding movement of the chains. Should the closing bar be operated again the spring 103 will permit the ring 91 to move idly on the hub 88 so that no damage to the machine can result from carelessness of the operator. It will be understood of course that after each closing operation the driving clutch will be automatically opened so that the main shaft 16 will stop in the position shown in Fig. 2, and that after the next row of links have been positioned the machine will be thrown into operation by manipulation of the controlling rod 33.

The frame 44 is strengthened and braced by a plurality of brace rods 108, and a backing for the central portion of the assembled fabric is provided by slats 109 adjustably connected at their lower ends by bolts 111 (Fig. 10) to the stationary anvil, provision for adjustment being made so that the slats may be adjusted laterally to permit the requisite adjustment of adjacent link-supporting blocks 56. A brace bar 112 shaped substantially as shown in Fig. 1 is attached to the ends of the bar 55 and maintains the rigidity thereof under the downward pull on the links of the fabric.

After a fabric has been completely assembled by successive operations of the machine, as described, the rod 106 is turned so as to force the shoulder 127 of the bolt 101 against the upper extension 93 to thereby separate the extensions 93 against the force of the spring 103 and release the frictional engagement between the ring 91 and the hub 88. The shaft 45 is now free to turn and the bar 55 may be pulled down by the operator into its initial position so that the fabric may be taken off and a new row of links may be positioned on the supporting hooks 58. The rod 106 is then turned to withdraw the shoulder 127 from the upper extension 93 thereby reëstablishing the frictional driving connection between the arm 66 and the ratchet wheel 87.

It is believed that our invention and its mode of operation will be fully understood from the foregoing without further description, and it should be obvious that the details of construction which have been shown and described for purposes of illustration are capable of considerable modification without departing from the scope of the invention, as set forth in the following claims.

We claim:

1. In a wire fabric link closing machine, the combination of means for suspending a row of fabric links in a substantially vertical plane with their hooked ends depending in position to receive a second row of links, and means for automatically closing at one operation all the hooks of said first-mentioned row of links.

2. In a wire fabric link closing machine, the combination of means for suspending from their apices a plurality of substantially V-shaped fabric links having hooked ends, and a single means for automatically closing all the hooks of said links simultaneously when in suspended position.

3. In a wire fabric link closing machine, the combination of means for supporting a row of fabric links with their hooked ends in position to receive a second row of links, means for alining the hooks of said links, and means for subsequently closing said hooks.

4. In a wire fabric link closing machine, the combination of means for supporting a row of hooked links, means for alining said hooks, means for closing the hooks, and means for moving the row of links a distance equal to the length of a link.

5. In a wire fabric link closing machine, the combination of means for supporting a row of hooked links, means for alining and closing the hooks around a second row of links engaged therewith, and means for automatically advancing said link-supporting means the length of a link after each closing operation.

6. In a wire fabric link closing machine, the combination of a horizontal vertically movable link-supporting means, mechanism for advancing said means by a step-by-step movement, and means for automatically and simultaneously closing all the hooks of a row of links between each advance of said supporting means.

7. In a wire fabric link closing machine, the combination of an anvil, mechanism for supporting a row of links with their hooked ends in proximity to said anvil, a link closer,

means for moving said closer into cooperative relation with said anvil to close the hooks of said links, and mechanism for automatically advancing the closed links a predetermined distance after each closing operation.

8. In a wire fabric link closing machine, the combination of a vertically disposed anvil, means for suspending a row of links with their hooked ends in proximity to the face of said anvil, a bar normally positioned below said anvil, and means for elevating said bar and then moving it horizontally toward said anvil to compress the link hooks between said bar and anvil into closed position.

9. In a wire fabric link closing machine, the combination of an anvil having a substantially vertically disposed operating face, means for suspending a row of hooked links in front of said anvil, a pivotally mounted and longitudinally movable arm, a closing bar carried by said arm, means for tilting said arm to move the bar into alinement with the hooks of said links, and means for moving the arm longitudinally whereby the bar is moved toward the anvil to close said link hooks.

10. In a wire fabric link closing machine, the combination of an anvil having a vertically disposed operating face, means for supporting a hooked link in proximity to said face, a link closing bar, a plate yieldably mounted thereon and having one edge projecting beyond the edge of the bar, means for moving the bar to position the projecting edge of the plate over the link hooks, means for moving the bar downwardly whereby said link hooks are alined by said plate, and mechanism for moving the bar toward the face of said anvil to close the hooks of said links.

11. In a wire fabric link closing machine, the combination of an anvil, a link carrying device, a link closing bar, a plate yieldably carried thereby, means for operating said bar to aline the link hooks through the instrumentality of said plate and subsequently close the hooks between the bar and the anvil, and mechanism actuated by the movement of said bar for automatically advancing the links a predetermined distance after each closing operation.

12. In a wire fabric link closing machine, the combination of a substantially vertically disposed frame, link carrying means extending transversely of said frame and movable up and down on the frame, means comprising a stationary anvil and a movable bar for closing the link hooks, and mechanism for automatically advancing the closed links a predetermined distance upwardly on said frame after each link closing operation.

13. In a wire fabric link closing machine, the combination of a substantially vertically disposed frame, a pair of sprocket wheels mounted at each end of said frame, chains trained over said sprocket wheels, a link carrying bar extending across the frame and attached to said chains, means comprising a stationary anvil, a movable closing member and mechanism for operating said member to close the hooks of the links suspended from said bar, and means for automatically operating said sprocket wheels to move the carrying bar upwardly on said frame a predetermined distance after each closing operation.

14. In a wire fabric link closing machine, the combination of a frame, a horizontal anvil having a vertical face mounted on said frame, a pair of arms pivoted on said frame so as to be capable of oscillatory and reciprocatory movements, a link closing bar carried by said arms, means for swinging said arms on their pivots to raise the closing bar to a position in front of the operating face of said anvil, a plate carried by the bar and projecting toward the anvil beyond the corresponding edge of the bar, mechanism for moving said arms longitudinally to force the closing bar toward the anvil, and means for returning the bar to normal position below the anvil.

15. In a wire fabric link closing mechanism, the combination of a frame, a shaft mounted therein, cams fixed on said shaft, a stationary anvil, a pair of pivotally mounted arms, a link closing bar carried by said arms, cam followers carried by the arms in position to be actuated by said cams whereby the arms are oscillated on their pivots, a secondary cam shaft driven from said first-mentioned shaft, and cams on said secondary shaft for moving said arms longitudinally on their pivots to bring said closing bar into coöperative relation with said anvil.

16. In a wire fabric link closing mechanism, the combination of a frame, a stationary anvil carried thereby, a pair of arms pivotally mounted on said frame, a link closing bar carried by said arms, a plate slidably mounted on said bar, cam mechanism for raising and lowering said arms on their pivots, cam mechanism for moving said arms longitudinally, and means for operating said cam mechanisms.

17. In a wire fabric link closing mechanism, the combination of a frame, a shaft mounted therein, a power wheel loosely mounted on said shaft, a pair of cams fixed on said shaft, means operated by said cams for closing the hooks of fabric links, a clutch interposed between said wheel and said shaft, manually controlled means for throwing said clutch into operation, and means for automatically releasing said clutch upon one revolution of the shaft.

18. In a wire fabric link closing machine, the combination of a frame, a shaft mounted

therein, a wheel rotatably mounted on said shaft, a clutch adapted to connect said wheel to said shaft, means for automatically releasing said clutch upon one revolution of the shaft, manually operated mechanism for rendering said clutch-releasing mechanism inoperative, means operated from said shaft for closing a row of fabric links at each revolution of the shaft, and means operated from said shaft for advancing the closed links after each closing operation.

19. In a wire fabric link closing machine, the combination of a substantially vertically disposed frame, a fabric supporting bar extending transversely of the frame, means for moving said bar longitudinally of the frame, and a plurality of adjustably mounted slats forming a backing for the fabric.

20. In a wire fabric link closing machine, the combination of a substantially vertically disposed frame, link supporting means extending transversely thereof, mechanism for feeding said supporting means upwardly by a step-by-step movement, means for rendering said mechanism inoperative, and a plurality of backing strips carried by said frame rearwardly of the link supporting means.

21. A wire fabric link closing machine, comprising a bar having a plurality of blocks adjustably mounted thereon, each of said blocks being provided with means for supporting a fabric link and means for locking said blocks in adjusted position.

22. In a wire fabric link closing machine, a transversely extending bar, a plurality of blocks adjustably mounted thereon, each block being provided with a link-engaging hook, and means for feeding said bar and the blocks carried thereby a predetermined distance at each operation of the machine.

23. A wire fabric link closing machine, including a plurality of adjustably mounted blocks, each provided with a link supporting hook and means whereby said block may be locked in adjusted position.

24. In a wire fabric link closing machine, the combination of a link closing bar, a plate slidably mounted thereon, and means for yieldingly urging one edge of the plate beyond the corresponding edge of said bar.

25. A wire fabric link closing machine, including a stationarily mounted support, an anvil block carried by said support with its operating face disposed in a substantially vertical plane and a member movable vertically and horizontally in coöperative relation with said block.

26. A wire fabric link closing machine, including a stationary anvil comprising a plurality of blocks having a plurality of shallow corrugations on their operating faces to prevent slippage of the links along the blocks when pressed against the anvil.

27. A wire fabric link closing machine, including a stationary supporting member and a plurality of anvil blocks mounted thereon, said blocks having corrugated operating faces disposed in a substantially vertical plane.

28. In a wire fabric link closing machine, the combination of a vertically disposed frame, means for supporting and advancing a fabric step-by-step upwardly on said frame as the fabric is assembled, and a plurality of strips carried by said frame intermediate its sides, affording a backing for said assembled fabric.

29. In a wire fabric link closing machine, the combination of means for supporting a row of hooked links, means for closing the hooks, and means for moving the row of links a distance equal to the length of a link.

30. In a wire fabric link closing machine, the combination of an anvil, mechanism for supporting a row of links with their hooked ends in proximity to said anvil, a link closer, and means for moving said closer into coöperative relation with said anvil to close the hooks of said links.

31. In a wire fabric link closing machine, the combination of an anvil, means for supporting a hooked link in proximity to said anvil, a link closing bar, a plate yieldably mounted thereon and having one edge projecting beyond the bar, means for moving the bar to position the projecting plate edge in coöperative relation with the link hooks, means for moving the plate to aline said link hooks, and means for moving the bar toward the anvil to close said hooks.

32. In a wire fabric link closing machine, the combination of an anvil, a link-carrying device, a link closing bar, a plate yieldably carried thereby, and means for operating said bar to aline the link hooks through the instrumentality of said plate and subsequently close the hooks between the bar and the anvil.

33. In a wire fabric link closing machine, the combination of a frame, a shaft mounted therein, cams fixed on said shaft, a pair of pivotally mounted arms, cam followers carried by the arms in position to be actuated by said cams, whereby the arms are oscillated on their pivots, a secondary cam shaft, and cams on said secondary shaft for moving said arms longitudinally on their pivots.

34. In a wire fabric link closing machine, the combination of a frame, a stationary anvil, an arm pivotally and slidably mounted on said frame, cam mechanism for swinging said arm on its pivot, and cam mechanism for moving said arm longitudinally.

35. In a wire fabric link closing machine, the combination of a frame, a shaft mounted therein, a power wheel, means operated by said shaft for closing the hooks of said fabric links, a clutch interposed between said

wheel and said shaft, manually controlled means for connecting said wheel to said shaft, and means for automatically breaking said connection upon each revolution of the shaft.

36. In a wire fabric link closing machine, the combination of a frame, a shaft mounted therein, a wheel rotatable on said shaft, a clutch for connecting said wheel to the shaft, means for automatically releasing said clutch upon one revolution of the shaft, manually operated mechanism for controlling said clutch releasing mechanism, means operated from said shaft for closing a row of fabric links at each revolution of the shaft, and means for advancing the closed links after each closing operation.

37. In a wire fabric link closing machine, the combination of a substantially vertically disposed frame, link supporting means extending transversely thereof, mechanism for feeding said supporting means upwardly by a step by step movement, and manually operable means for releasing said feeding mechanism to permit retrograding movement of the link-supporting means.

38. In a wire fabric link closing machine, the combination of a vertical frame, a shaft mounted on the upper end thereof, sprocket wheels on said shaft, chains trained over said sprocket wheels, a link-supporting bar carried by said chains, means for operating said shaft to advance the bar upwardly on the frame, said means including a frictional driving connection, and manually controlled means for breaking said connection to permit manual movement of said supporting bar.

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