

W. GRIMM & W. F. DREXLER, JR.

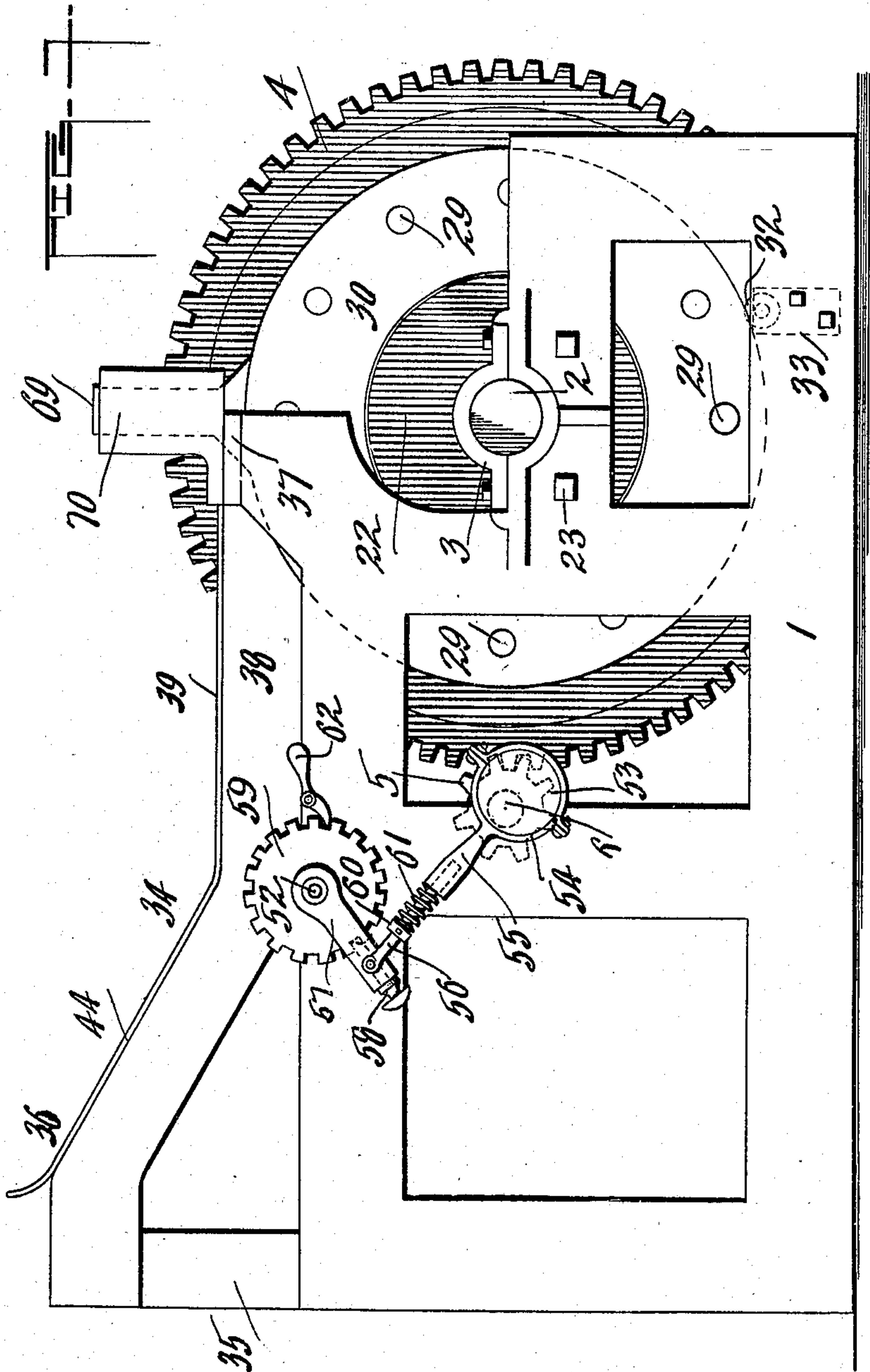
WIRE FABRIC MACHINE.

APPLICATION FILED JAN. 9, 1906.

923,645.

Patented June 1, 1909.

7 SHEETS—SHEET 1.



Witnesses:  
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Ben. Haute.

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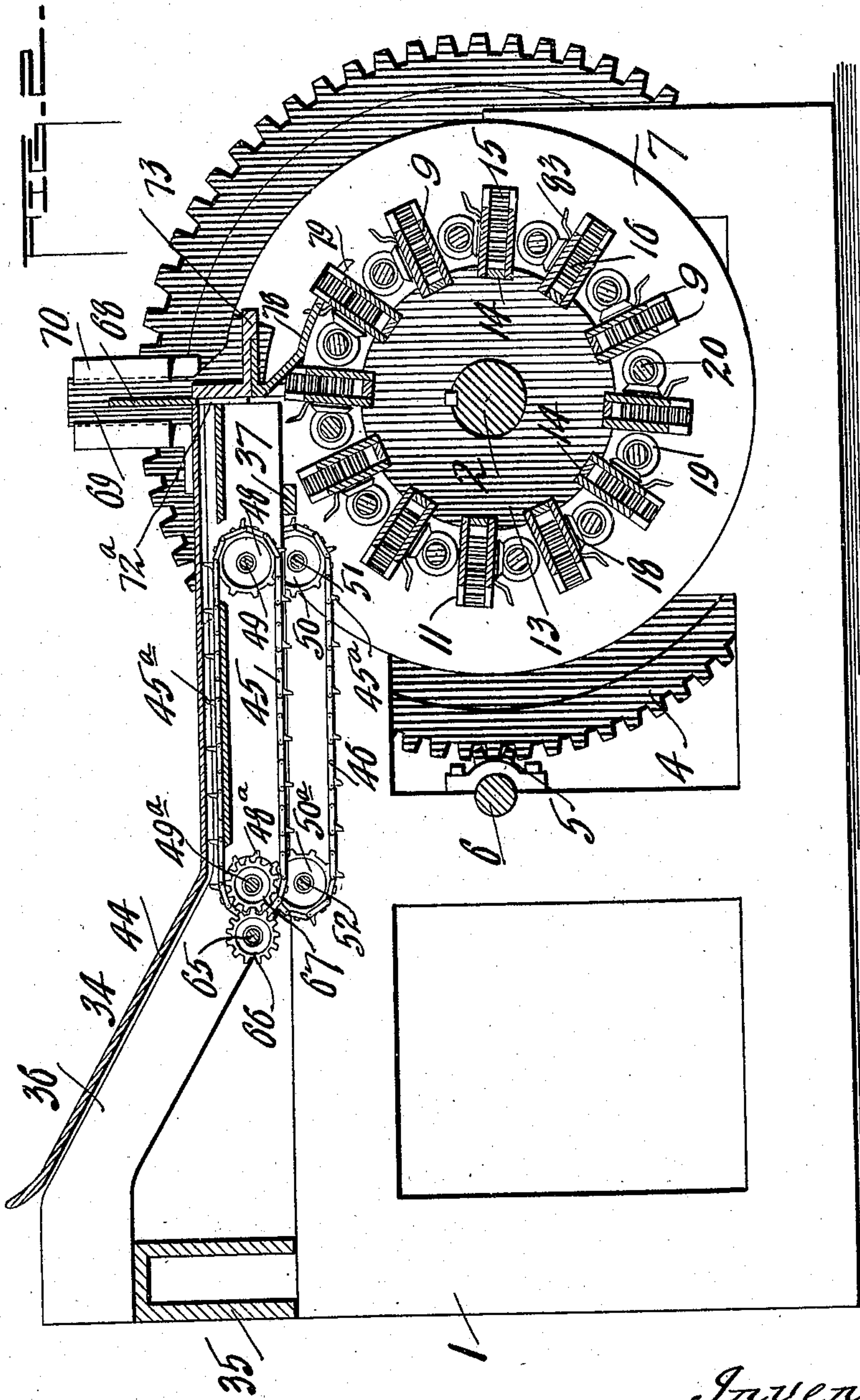
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7 SHEETS—SHEET 2.

**923,645.**



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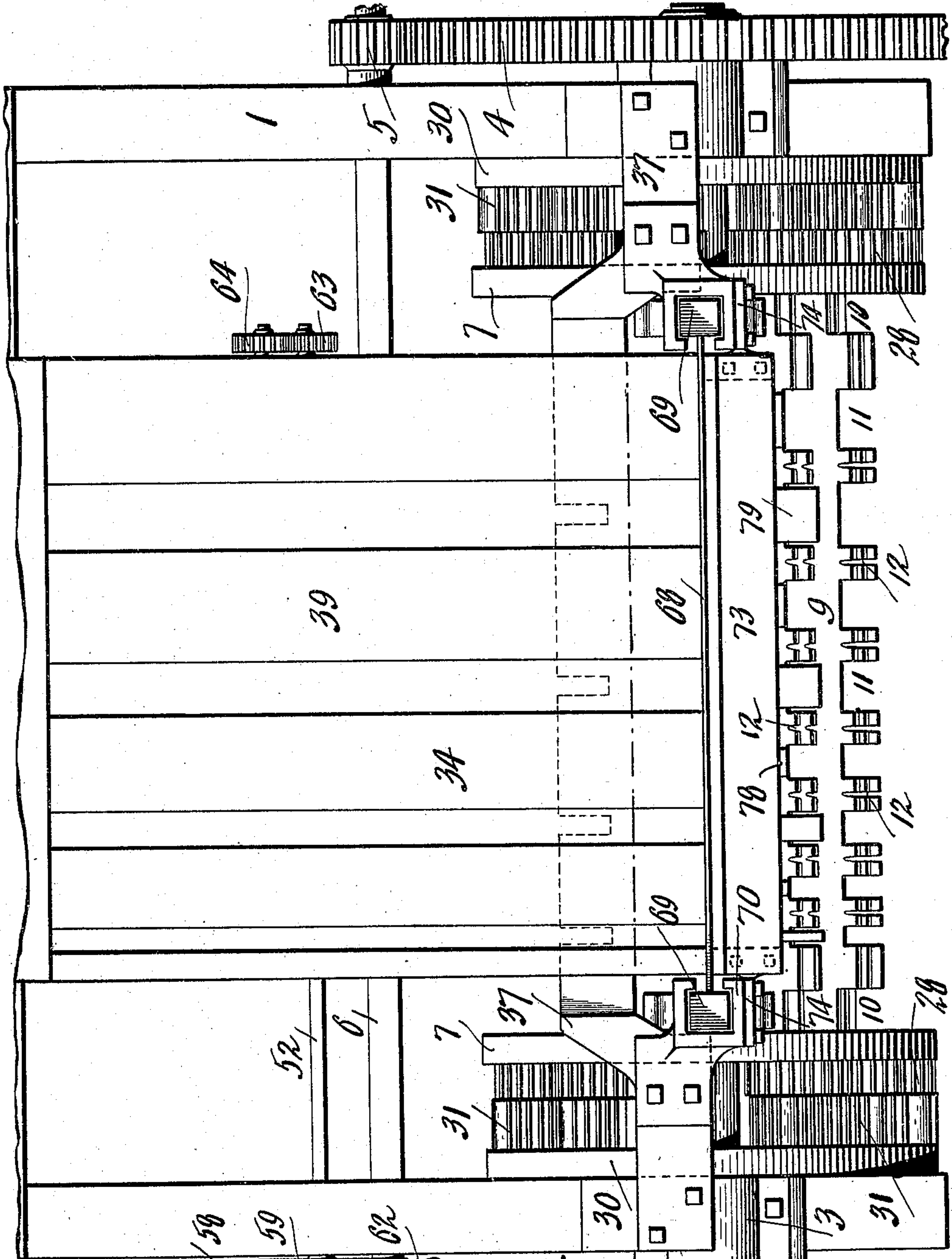
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7 SHEETS—SHEET 3.

923,645.



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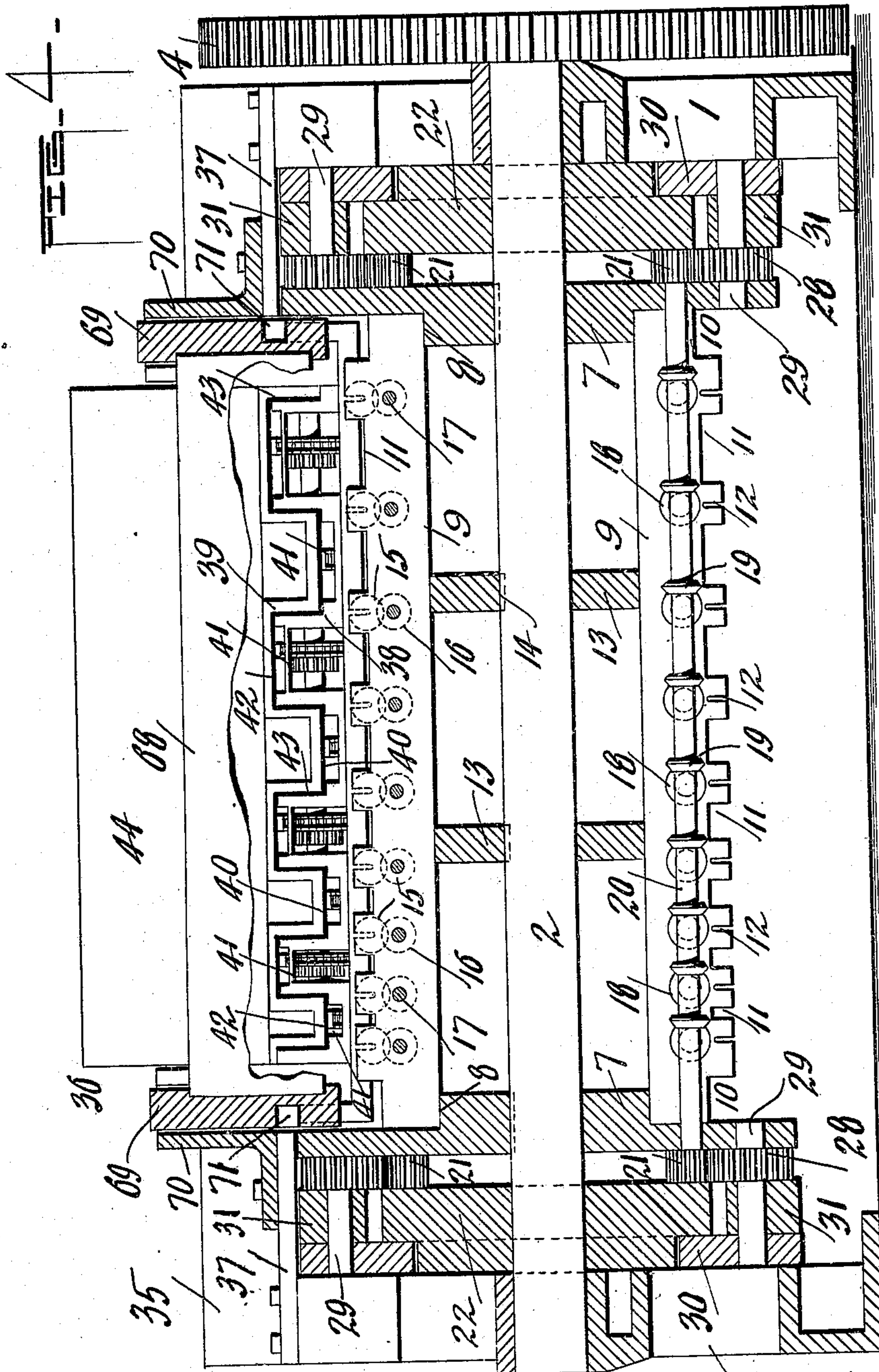
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APPLICATION FILED JAN. 9, 1905.

Patented June 1, 1909.

7 SHEETS—SHEET 4.

923,645.



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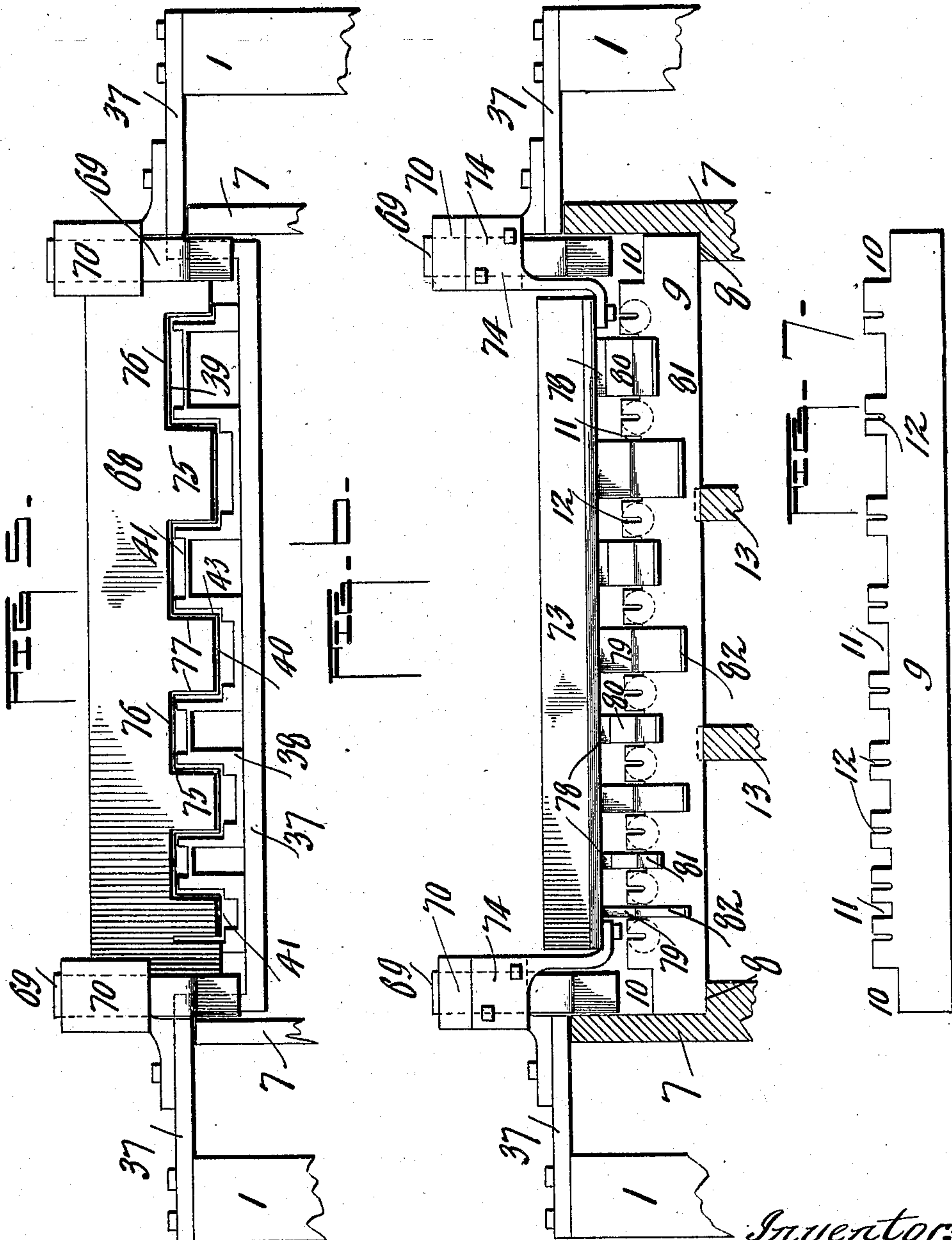
WIRE FABRIC MACHINE.

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923,645.

Patented June 1, 1909.

7 SHEETS—SHEET 5.



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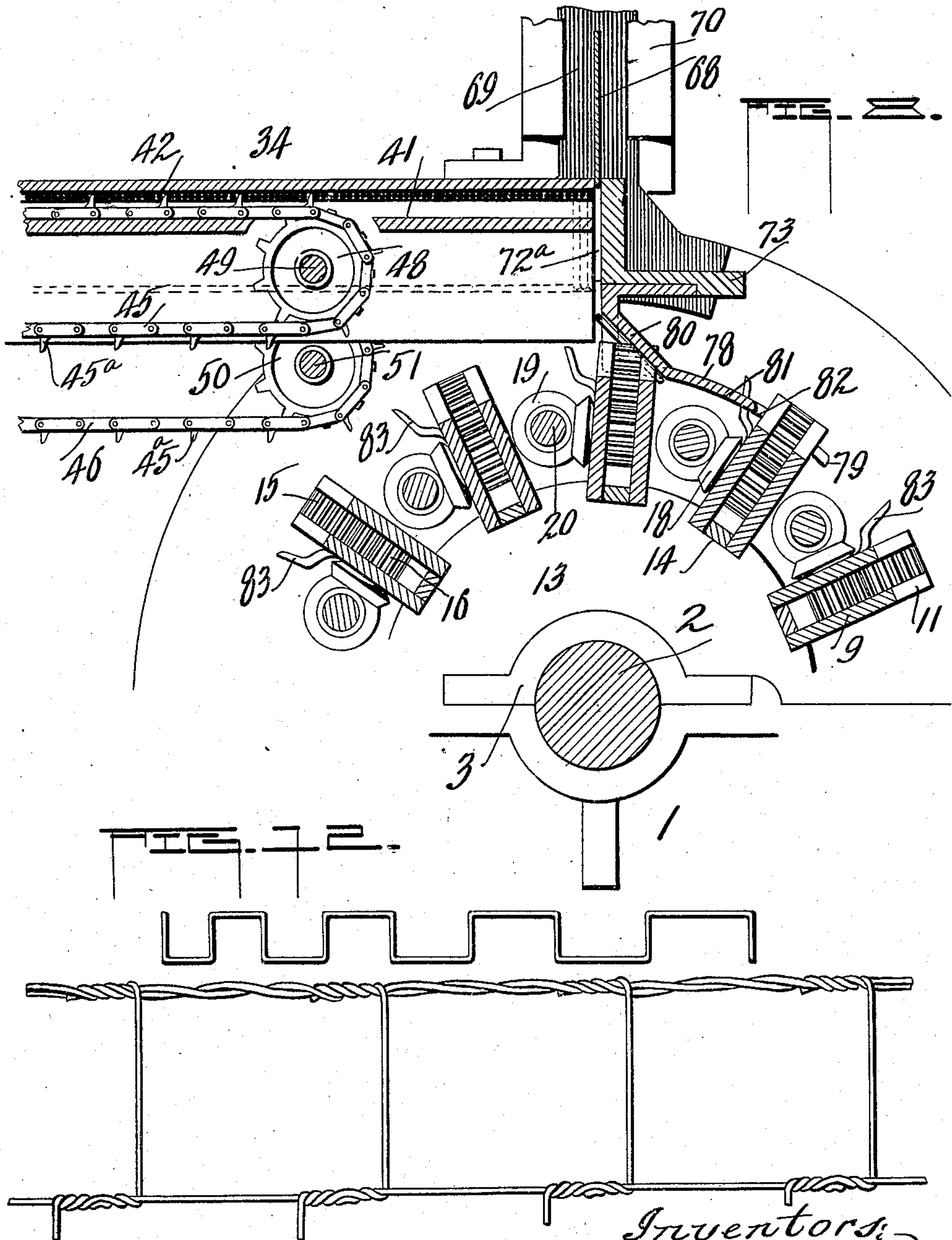
WIRE FABRIC MACHINE.

APPLICATION FILED JAN. 9, 1905.

Patented June 1, 1909.

7 SHEETS—SHEET 6.

923,645.



Witnesses: *St. V. Gibson*  
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Fig 13

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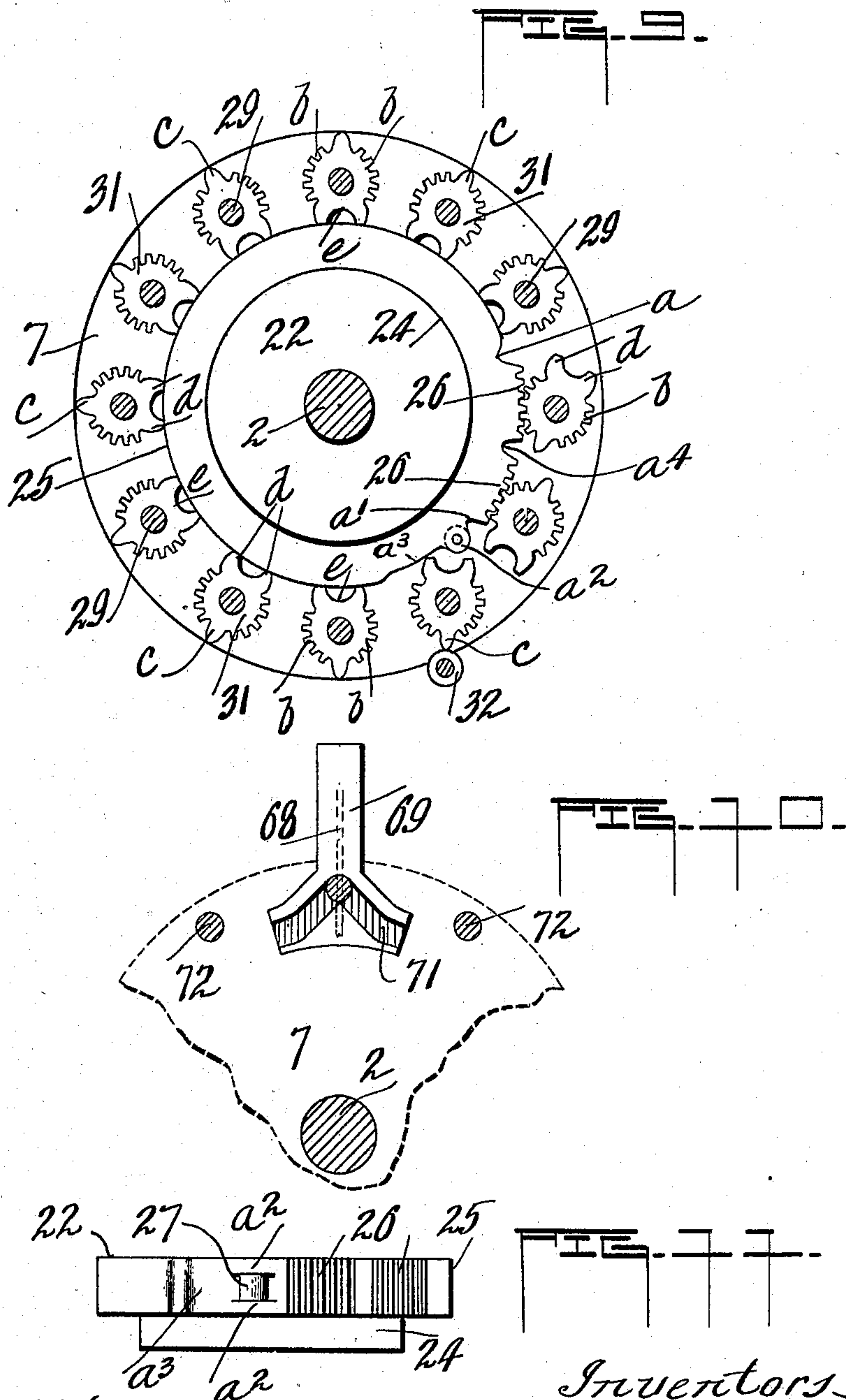
WIRE FABRIC MACHINE.

APPLICATION FILED JAN. 9, 1906.

923,645.

Patented June 1, 1909.

7 SHEETS—SHEET 7.



Witnesses:  
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# UNITED STATES PATENT OFFICE.

WILLIAM GRIMM AND WILLIAM F. DREXLER, JR., OF MORTON, ILLINOIS, ASSIGNORS TO  
INTERLOCKING FENCE COMPANY, OF MORTON, ILLINOIS, A CORPORATION OF ILLINOIS.

## WIRE-FABRIC MACHINE.

No. 923,645.

Specification of Letters Patent.

Patented June 1, 1909.

Application filed January 9, 1905. Serial No. 240,375.

*To all whom it may concern:*

Be it known that we, WILLIAM GRIMM and WILLIAM F. DREXLER, Jr., citizens of the United States, residing at Morton, in the county of Tazewell and State of Illinois, have invented certain new and useful Improvements in Wire-Fabric Machines; and we do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same.

This invention has reference to a machine for the manufacture of wire fence fabric, having for its object a twister support traveling in a continuous orbit, and to mechanism for feeding and depositing successively and continuously stay-wires in the said twisters.

A further object of the invention is a twister frame mounted for continuous rotation, a series of rows of twisters revolubly mounted on the said frame, means for actuating the said twisters, and mechanism for continuously feeding a series of stays side-wise to present the same to the twisters, the said stays being formed previous to feeding and of length to reach from one outside twister to the other outside twister of the series and spanning the spaces between and engaged by the intermediate twisters of the series.

The invention has for its further object twisting devices to which are adapted to be fed a series of longitudinal or running wires, and mechanism for feeding successively a series of stay-wires of suitable length to the said twisters, the said stays being formed previous to feeding and fed in a feed-way or guide conforming to the outline of the said stays.

A further object of the invention is a traveling frame, a series of twisting devices mounted for rotation in said frame, means for inaugurating the movement of the twisters at the same point in said frame, running wires adapted to be fed to the said twisters, mechanism for feeding a series of stay-wires to the twisters to be intertwisted with the running wires fed thereto, said mechanism comprising a feed-way or grooved frame, and a series of carriers adapted to receive the stays and deposit the same in position to be received by the twisters afore-

said, and means for guiding the stays into the twisters.

The invention consists of a base frame, a revoluble frame mounted for continuous rotation in the base frame, a series of twisting devices mounted in rows on the said revoluble frame and each row of twisters successively brought into action, means for inaugurating the movement of each and all of the twisters in each row at the same point in the frame, running wires fed to the said twisters; stay feeding mechanism supported by the base frame, comprising feeders for moving in a step by step motion stay wires to each row of twisters as they come into proper position, a reciprocating member adapted to engage and lower each successive stay to the revoluble frame and guiding means for insuring the deposit of the said stays in the twisters.

The invention is somewhat of the type as that found in an application for patent filed by Elwell, Grimm and Drexler, Jr., on the 21st day of March 1904, bearing Serial Number 199,129, wherein the revoluble or traveling frame, the twisters, and the driving means are similar; however as will be noted, it is preferred to employ more rows of twisters and have the rows of twisters correspond, also to provide for the manufacture of a straight stay or square mesh fence.

The invention comprises details to be hereinafter more particularly pointed out in the following specification, claimed in the appended claims and illustrated in the accompanying drawings, in which—

Figure 1 shows in side elevation, somewhat reduced, a machine embodying our improvements; Fig. 2 is a vertical cross-section, somewhat reduced, through the revoluble frame, and a longitudinal section through the stay feeding devices; Fig. 3 is a plan view, somewhat reduced, showing a general outline of our machine, with the twisters of the revoluble frame omitted; Fig. 4 is a vertical longitudinal section, through the revoluble frame, and the driving mechanism for the twisters located at each end; the figure also showing in dotted outline the twisters and their positions, and an end view of the stay feeding devices, with a stay outlined in black. Fig. 5 is a front elevation of a portion of the supporting frame, the feed-way for the stay-wires, and the reciprocating



member for depositing the stays on the revoluble frame; Fig. 6 is a front elevation of a portion of the supporting frame, also a portion of the revoluble frame, and the devices and support therefor, for guiding the stays into the twisters of the said revoluble frame; Fig. 7 is a detached view in elevation of a support of the revoluble frame; Fig. 8 is an enlarged sectional detail showing a portion of the feed-way for the stay-wires, and a series of stays in position being fed forward to the revoluble frame; also the stay feeding mechanism, the means for depositing the stays onto the revoluble frame, a portion of the revoluble frame, and an edge view of a stay as the same is guided into the twisters; Fig. 9 is a detached view in elevation of the mechanism for imparting power to the twisters; Fig. 10 is a detail of the means for depositing a stay wire onto the revoluble frame; Fig. 11 shows an edge view of parts seen in Fig. 9; Fig. 12 is an outline of a stay, showing its formation which is also the contour of the guide-way in which the said stays are fed; and Fig. 13 is a view of a portion of the fabric made by the machine herein referred to.

Like numerals of reference indicate corresponding parts throughout the figures.

The machine is built up of the side frame parts 1, being substantially of the design shown; however, these may be substituted with some other form if desired. The forward ends of the frame parts 1 support a shaft 2 horizontally disposed, which is the preferred arrangement in this construction, with the opposite ends of the said shaft journaled in the boxings 3 of the frames 1. It is adapted to rotate the shaft 2 continuously, for purposes to be further described, the said shaft carrying a large gear wheel 4 on one terminal which meshes with and is driven by a pinion 5 on one end of a driving shaft 6 suitably journaled in the frame 1, and receiving its power from suitable mechanism, not shown.

The shaft 2, as will become apparent in the further description of the machine, supports the twisting devices, as well as the mechanism for actuating the same during the continued rotation thereof.

On the shaft 2, at or near its opposite ends and within the frame, are carried and secured thereto the heads or disks 7 constructed with the offset body portions 8, the outer edge of which forms a seat for supports or frames to be described. The supports or frames referred to consist of a series of pairs of flat bars 9. Each pair of bars is spaced a short distance apart, while the adjacent pairs of bars are spaced a somewhat farther distance from each other, and the opposite ends of each of the bars seated on the edge of the off-set portions 8 of the heads or disks 7 and suitably secured thereto, see Figs. 2 and 4.

The bars are in all respects similar to each other, being provided with the cut-out portions 10 at their opposite ends, and with the cut-out and slotted portions 11 and 12 at desired intervals intermediate their ends. The cut out portions 10 provide for the depressing of certain parts to be described, while the cut out portions 11 are guide-ways for fixed frame parts, and the slots 12 are wire grooves by means of which wires may be deposited into the twisters supported by the frames 9. In the drawings the wire grooves are shown at graduated distances, but they may be spaced at uniform distances if it is desired. To support the body of the frames 9 intermediate their ends we have provided the smaller disks or heads 13 having cut-out portions 14 at intervals in their peripheral edges in which the frames 9 may be seated, see Fig. 2.

Disposed intermediate each pair of bars 9 and at intervals coinciding with the grooves 12 therein, are carried twisters 15 of the slotted type, the slots of the twisters corresponding to the grooves 12 in the bars 9 and serving as a means for engaging a wire or wires for twisting the same in the movement of the twisters. The twisters each have gear teeth and by this means are rotated, the same meshing with gears 16 carried by short shafts 17 journaled in the bars 9, and these shafts on one of their outer terminals carry the bevel pinions 18 meshing with the beveled pinions 19 carried on driving shafts 20 paralleling the frames 9 and carried in the opposite heads or disks 7, the end of the said shafts also passing through the heads and carrying thereon the pinions 21. The twist-ers 15 and the gears 16 are somewhat similar to those in the application referred to, the twist-ers being also journaled in the bars 9, and it is not thought that further description is here needed, as no specific claim is made upon the twist-ers nor their intermeshing gears 16, but upon the general arrangement and combination of the same together with devices to be described.

In the operation of the twist-ers it is aimed to inaugurate the movement of each row thereof at the same point in the frame, imparting to the same an intermittent rotary motion opposite to the rotation of the frame which supports the same, consisting of the heads 7, 13 and the bars 9, the mechanism for operating the twist-ers being such that the twist-ers may have two or more revolutions imparted to them and then held in position to receive the wires to be fed thereto. This mechanism consists of cam-gears 22 disposed at opposite ends of the shaft 2 between the disks 7 and the frames 1, through which the shaft 2 passes, and the said cam-gears supported in a fixed position relative to the movement of the shaft and parts carried thereby, by means of bolts 23 or other suit-



able means. The disks 22 are provided with the off-set bodies 24, also the smooth peripheral cam-faces 25 and the segment-gear sections 26. The gear sections 26 at their outer ends terminate into the depressions  $a$  and  $a'$ ; the former merging into the cam face 25 while the latter terminates into a pair of ears  $a^2$ , between which is carried a roller 27, the peripheral edge of which is of the same radius as the ears  $a^2$ ; and these ears upon the opposite side of the depression  $a'$  merge into a depression  $a^3$  which is of suitable length. The sections of gear 26 are separated by an enlarged toothed depression  $a^4$  similar to the depressions  $a$  and  $a'$  and for a similar purpose, all of which will be explained.

To impart power to the shafts 20 through the pinions 21 and the gear sections 26, there is provided a series of gear wheels 28 which are in continuous mesh with the pinions 21, the same carried on short shafts 29, one end of which is carried in the head 7 and their outer ends in a ring 30 encircling and adapted to have a concentric motion, in the movement of the revolving frame around the off-set portion 24 of the cam-gear 22, see Fig. 4. On each of the said shafts 29 intermediate the gears 28 and the rings 30 are carried the cam-pinions 31, so called because of their peculiar shape.

The cam-pinions are best seen in Fig. 9, which shows in elevation one of the end disks 7, the cam-gear 22, the short shafts or spindles 29 and the pinions 31, carried on the said shafts or spindles, and illustrating the manner in which the pinions 31 are retained in inoperative position, also the manner of imparting rotation to the said pinions during the continued rotation of the shaft 2 and the disks or heads 7. It will be shown that, in addition to the pinions 31 being rotated sufficiently to impart the desired rotation to the twisters 15 through the gearing described, the pinions 31, through suitable devices have an additional partial rotation imparted to them, to rotate the twisters a little more than is necessary to obtain the desired twist of the stay and longitudinal wires, so that as the twisted portions of the fabric or fence leave the twisters, the relax of the wires will not affect the same, but leave the twisted portions with the desired number of turns or twists to insure the interlock or intertwist which is desired, the form of which will be further described. The pinions each have the oppositely arranged toothed portions  $b$ , the intermediate enlarged tooth-shaped member or cam lug  $c$ , and the pair of tooth-shaped members or cam lugs  $d$ , similar to the lug  $c$ , which are upon opposite sides of a concave semi-circular depression  $e$ . At point  $a$  on the cam-gear 22 it is desired to inaugurate the movement of the pinions 31, and through

the same and the gearing described, the twisters 15. In the rotation of the shaft 2 and the heads 7, from  $a^3$  on the cam-gear to the point  $a$ , the lugs or teeth  $d-d$  are riding on the cam-surface 25 retaining the pinions 31 and the gearing connected therewith in a fixed position. As the pinions 31 ride against the upper gear section 26 the pinions are caused to mesh with the same; and the depression  $a$  serves to allow the lug  $d$  of the pinion 31 which is coincident with the same to have room to make the sweep in the rotation of the pinions. As the pinions pass from one section 26 to the other of the cam-gear 22, the lug or tooth  $c$  thereof engages the depression  $a^4$ , which permits the further rotation of the said pinion. At the point  $a'$  where the pinions leave the lower gear section 26, the depression  $e$  is caused to engage and ride over the ears  $a^2$  and the roller 27 of the said cam-gear 22, imparting an additional partial rotation to the said pinion, as was above described; the depression  $a'$  permitting the coinciding tooth  $d$  of the pinion to clear the section 26. During the continued rotation of the shaft 2 and disk 7 the tooth or lug  $c$  of each of the pinions is caused to engage with a roller 32, as seen in Fig. 9, which forces the pinions into a position where the lugs or teeth  $d$  thereof will ride onto the cam-face 25; the depression  $a^3$  permitting the lugs or teeth  $d$  of the pinions to pass the edge of the gear as the same are partially rotated through engagement of the tooth  $c$  with the roller 32. The roller 32 is supported by a bracket 33 from the frames 1, (see Fig. 1).

From the above description it is believed that the operation of continuously rotating the shaft 2, the heads 7 and 13 carrying the frames 9 and the twisters 15, and the manner of imparting rotation to the twister at intervals during each complete revolution, will be clearly understood.

The stay feeding devices will now be described, showing how the stays are fed, also the means for directing and depositing each complete stay section into the twisters: Disposed with its forward end approximately above the center of the shaft 2 and the revoluble frame carried thereby, so as to allow the tops of the frames to pass beneath the same, is a guide-way or feeder 34, in width sufficient to permit of feeding a stay wire or wires which are of length to extend from one outside twister to the opposite outside twister of the series. This feeder or guide-way extends back from the revolving frame a suitable distance, then rises on an angle as at 36 and backward to the rear end of the frames 1, being supported at the rear end by the cross frame 35, as seen in Figs. 1 and 2. The support for the forward end of the feeder consists of the bar or frame 37, the opposite ends of which are secured to the frames 1 carried



inwardly, then dropped down over the disks or heads 7 and across beneath the feeder, as clearly seen in Fig. 3.

The feeder or guide-way is formed of two sections 38 and 39, the former being the lower and the latter the upper or overlying section, both of which are formed with matching U-shaped portions 40, the alternate U-shaped portions being inverted as shown, and coinciding with each of such U-shaped portions are run-ways or guides 41. The assembling of the sections 38 and 39 provides a sinuous passage-way having the alternately disposed horizontal-ways 42 and the alternate connecting vertical ways 43. In Fig. 4 a front elevation is seen of the ends of the sections 38 and 39 when the same are in position, also showing in black outline a stay wire conforming to the ways 42 and 43 just described. It is required that the stays shall be formed in the manner shown, previous to being placed in the sections of the feeder 34, and they are placed in the same by inserting the body of the stays in the horizontal and vertical ways described, at the rear end, and beneath the covering plate 44, when the same will slide down the incline 36 provided and enter the horizontal portion of the feeder and be taken up by a series of carriers and fed to the discharge end of the feeder and deposited in the twistors of the revoluble frame. These carriers consist of a series of link-belts 45 and 46, each of which is provided with a series of fingers or plates 45<sup>a</sup>, which in the movement of the carriers are adapted to engage with the horizontal portions of the stay-wires and in a step-by-step movement advance the said stays from where they enter the horizontal portion of the feeder, to the discharge end thereof. The carriers 45 travel in each alternate guide or run-way 41 around the front and rear sprocket wheels 48 and 48<sup>a</sup>, which are mounted on the short studs or spindles 49 and 49<sup>a</sup>, while the carriers 46 travel in run-ways or guides 41 intermediate the carriers 45, and around the front and rear sprocket wheels 50 and 50<sup>a</sup>, carried on the shafts 51 and 52, which are disposed in a vertical plane beneath the spindles 49 and 49<sup>a</sup>. The said shafts 51 and 52 are carried across and beneath the feeder and journaled in a suitable manner to some suitable support attached thereto, but not shown.

The mechanism for imparting the desired motion to the carriers 45 and 46 consists of the following devices: On one terminal of shaft 6 is carried an eccentric 53, the strap 54 of which is provided with a tubular extension 55 in which is carried one end of a rod 56, the outer end of which is pivotally connected to the outer end of an arm 57 which is carried on the outer end of the shaft 52; and the arm 57 has an off-set carrying a spring-held pawl 58 engaging the teeth of a

ratchet-wheel 59 on the end of shaft 52, adjacent to the arm 57. The rod 56 is provided with a collar 60 between which and the end of the extension 55 on the said rod is carried a coil spring 61 which permits the ratchet to have more or less movement under undue tension of the wires in feeding or in case of crowding of the wires during the feed, to prevent blocking of the mechanism or breakage of parts. The ratchet wheel 59 is retained in adjusted positions by means of the weighted pawl 62 pivoted to the side of frame part 1, as seen in Fig. 1, in which figure is also seen clearly the ratchet device above described. The ratchet devices are slightly different from the well known form commonly used in shaping machines and like devices.

From the above description, it will be clearly seen that any motion imparted from the shaft 6 to the shaft 52 through the ratchet described, will impart a similar movement to the carriers 46, while at the same time a corresponding motion will be imparted to the carriers 45 through a gear 63 on the opposite terminal of shaft 52 intermeshing with a gear 64, on a counter shaft 65, which carries a series of gears 66, meshing with gears 67 on the said shafts or spindles 49<sup>a</sup>. Through the carriers 45 and 46 a corresponding movement will be imparted to the upper and lower horizontal portions of the stays, and by reason of the series of carriers the stays may be bodily advanced from one end of the feeder to the other, without the danger of buckling.

In Fig. 8, an enlarged view is made to illustrate the carriers in the act of advancing the stays, also the means of depositing the same onto the revoluble frame and directing the same into the twistors. Movable up and down in front of the discharge end of the feeder 34 is a plate 68, the rear face of which moves in juxtaposition to the edge of the feeder. The said plate at its opposite ends is secured to duplicate plungers 69 movable up and down in guides 70 supported by the frame 37, see Fig. 3. The lower ends of the plungers 69 are provided with the cam-slots 71, which are adapted to be engaged by a series of pins or rollers 72 suitably spaced and secured to the inner faces of the heads or disks 7. The rollers are so spaced apart on the heads 7, that as one leaves the cam slot 71 of the plunger 69 the succeeding roller enters the same, the slot being of such contour that as the disks or heads 7 are rotated the plunger by means of the rollers described, and as seen in Fig. 10, will be intermittently lowered and raised, imparting a corresponding movement to the plate 68 for a purpose to be described. A guide-way for the plate 68 is provided, as 72<sup>a</sup>, between the front edge of the feeder 34 and a stationary frame 73, see Fig. 8, the said frame 73, being supported by brackets 74 secured to the guides 70.



The plate 68 has its lower edge made in conformity to the contour of the stays with which it is to engage, having the depending portions 75, and intermediate depressed or cut-out portions providing the horizontal engaging edges 76, and the vertical engaging edges 77. The portions 75 are adapted to engage the lower horizontal portions of the stays, and the edges 76 are adapted to engage the upper horizontal portions of the stays, while the edges 77 lie alongside of the vertical portions of the stays, when engaged by the said plate. As the stay wires are successively forced into the guide-way 72<sup>a</sup>, the plate 68 is lowered, engaging the stays in the manner described, and forcing them down, with the lower portions of the stays in position to be engaged by the upper edge of the forward frames 9 of each pair. When in this position, it is provided that the lower horizontal portion of the stays shall lie in front of the forward bars 9 of each pair, intermediate the slots 12, while the vertical portions of the stays are forced into the slots of the bars 9 and the twisters 15, which brings the upper horizontal portion of the stays adjacent to the face of the rear bars 9 of each pair, intermediate the slots 12 thereof, and alternately disposed with reference to the portions of the stays upon the opposite side of the said bars 9. The devices for changing the angle or position of the stays, as they are deposited on the rotary frame, to deposit the portions thereof which are disposed vertically in the feed, into the twisters of the said frame, consist of a series of guide plates 78 and 79, being similar, and yet shaped so that there will be no chance for the stays failing to be deposited into the twisters. The guide plates 78 are supported from the frame 73, having the beveled bodies 80 which adapt the lower horizontal portions of the stays to be engaged by the frames 9 and carried forward at an angle, as seen in Fig. 8; the plate 78 having the curved extensions 81 which retain the forward portions of the stays in position until the same are engaged by the twisters. The plates 79, instead of having the beveled portions are carried down, straight, from the frame 73 to where they merge into the curved portions 82, seen in dotted lines in Fig. 8. The straight portions of the guides serve to hold the upper horizontal portions of the stays, during the changing of the angle of the said stays, to insure the engagement of the said stays by the twisters aforesaid, the curved portions 82 serving the same function as the portions 81 of the guides 78, being to retain the portions of the stays with which they engage, in position until the stays are firmly engaged by the twisters. The guides 78 and 79 or rather the curved portions 81 and 82 thereof, are adapted to be seated in the slots or cut-out portions 11 of the bars 9, as they are rotated into position where they coincide

with the guides aforesaid. In this way the stays may be forced down into the slots 12 of the bars 9 and also the slots of the twisters 15 and so held until the bodies of the said stays are within the grip of the twisters. Means has been provided for causing the twisters to uniformly grip the body of the stay-wires, so that there will be a uniformity of twist upon opposite sides of the center of the twist. This is accomplished by means of a series of lugs or pins 83 extending out from the face of the rear bars 9 of each pair, intermediate the slots in each bar, with which the bodies of the stays engage and are forced forward, until they lie in the twisters as desired. It is preferable to have these lugs or pins 83 tapered or beveled, for in this way the end above desired may be the better reached.

The timing of the carriers with reference to the rotation of the twister frame is such, that a stay is forced into the guide way 72<sup>a</sup> and the plungers 69 depressed carrying with them the plate 68, which engages each stay, carrying the same into a position to be engaged by the frames 9 as aforesaid during the interval of moving the twisters the distance corresponding to the space between each row of twisters, when, by means of the guides 78 and 79, the stays are deposited into the twisters; the plate 68 having time to rise before another stay is projected into the guide-way 72<sup>a</sup> as described, the rollers 72 being so positioned on the heads 7 that they do not depress the plungers and plate carried thereby until just previous to the twisters moving into a position to receive the stays.

It is preferable as shown to actuate the twisters from both ends of the frame, thereby obtaining more power; and while we have shown a stay having alternate right-angle portions, it is to be understood that the devices and feed of the stay may be modified to produce a still further form of mesh without departing from the broad principle herein outlined. Our aim is to provide a frame carrying twisters, which is adapted to travel in an endless orbit, and to provide means for feeding and depositing in a series of twisters in a row, stays which shall be engaged by all of the twisters of each row and intertwined with longitudinal or running wires fed to the said twisters to form a square mesh. The longitudinal wires are fed in any suitable way and from any of the well-known devices, such as spools or reels. The fabric after the twisters have accomplished their work is drawn off from the under side of the revolving frame at some suitable point after the twisters have left the gear sections 26 of the cam gear, when the slots of the twisters are directed outwardly in a way to free the fabric, and place the said twisters in a position to again receive the stay as well as the longitudinal wires to form the fabric.



From the foregoing description it will be understood that the operation of the drum is continuous and at intervals, or as each row of twist-ers or wire connecting devices passes the mouth of the stay wire feeder, a stay, which has been advanced sidewise, is deposited on the drum to be engaged by the twist-ers or wire connecting devices and that said twist-ers or wire connecting devices are adapted to simultaneously connect portions of the body of the stay intermediate its ends to the series of intermediate strand wires and the opposite ends of the stay to the selvage wires.

The style of the fence fabric and the form of the intertwist of the stay wires with the longitudinal wires, is substantially similar to that shown in Fig. 13 of the drawing.

It is obvious from the foregoing that various changes might be made in the construction and arrangement of the machine without departing from the principle and scope of the invention, and we do not wish to be confined to the details as shown and described.

Having thus fully described our invention, what we claim and desire to secure by Letters Patent of the United States, is:—

1. In a machine for making wire fabric, the combination with a plurality of slotted traveling wire connecting devices, of means for feeding stay-wires sidewise and depositing the same into said connecting devices.

2. In a machine for making wire fabric, the combination with a series of wire connecting devices movable in an endless orbit, of means for feeding stay-wires sidewise and depositing the same into said connecting devices.

3. In a machine for making wire fabric, the combination with a series of slotted twist-ers movable in an endless orbit, of means for inaugurating the movement of the twist-ers at the same point in their travel, and means for feeding stay-wires sidewise and depositing the same into said twist-ers.

4. A machine for making wire fence, comprising a series of traveling twisting devices adapted to retain and advance a series of strand wires, means for leading stays formed with alternate right-angle portions in the length thereof to the strand wires, and means for operating the twist-ers to connect said stays and strands in transit.

5. In a machine for making wire fence, the combination of several sets of traveling twist-ers movable in an endless orbit, and an endless stay-carrier supported with its delivery end above the path of the twist-ers.

6. In a machine for making wire fabric, the combination of several sets of traveling twist-ers movable in an endless orbit, and a series of endless stay-carriers supported with their delivery ends above the path of the twist-ers.

7. In a machine for making wire fabric, the combination with a rotary drum, of a

series of wire-connecting devices carried by the drum, means for inaugurating the movement of the twist-ers at the same point in their travel, and a stay wire feeder mounted above and having its opening disposed in a vertical plane above the axis of the rotary drum.

8. In a machine for making wire fabric, the combination with a rotary drum, of a series of wire-connecting devices carried thereby, means for intermittently actuating the twist-ers during the rotation of the drum and at the same point in their travel, a stay wire feeder mounted above the drum, and means for advancing stay wires from the feeder to the drum.

9. In a machine for making wire fabric, the combination with a rotary drum, of a series of wire-connecting devices carried thereby, means for intermittently actuating the twist-ers during the rotation of the drum and at the same point in their travel, a stay wire feeder mounted above the drum, means for advancing stay wires from the feeder to the drum, and means for depositing the stays as they are received by the drum into the twist-ers thereof.

10. In a machine for making wire fabric, the combination with a series of twist-ers mounted to travel in an endless orbit, of a stay wire feed-way for advancing sidewise previously formed stay wires to the said twist-ers, and one or more endless carriers mounted in the feed-way.

11. In a machine for making wire fabric, the combination with a series of twist-ers mounted to travel in an endless orbit, of a vertically disposed wire feed-way above the path of the twist-ers, means for feeding wire stays sidewise to the feed-way, and means for receiving the stays from the feed-way and depositing the same in the twist-ers.

12. In a machine for making wire fabric, the combination with a series of rows of twist-ers mounted to travel in an endless orbit, of a feed-way disposed above and transverse to the axis of rotation of the twist-ers, means for advancing stay wires to the feed-way, and means for discharging the said stays from the feed-way into the twist-ers.

13. In a machine for making wire fabric, the combination with a series of twist-ers mounted to travel in an endless orbit, the same adapted to receive and advance a plurality of strand wires, of a feeder for stay wires mounted above the said twist-ers, the said feeder formed with a sinuous wire groove conforming to the contour of the stays which it feeds, means for advancing stays in the feeder to be deposited into the said twist-ers, and means for operating the twist-ers to connect the strand and stay wires in transit.

14. In a machine for making wire fabric, the combination of a series of twist-ers, mount-



ed to travel in an endless orbit, means for inaugurating the movement of the twist-  
ers at the same point in their travel, means for  
advancing stay wires in a horizontal plane,  
5 means for directing the said stays in a ver-  
tical plane at a certain point in their travel,  
and means for depositing the said stays in  
the twist-ers.

15. In a machine for making wire fabric,  
10 the combination with several sets of twist-  
ers mounted to travel in unison, of a feeder for  
stay wires, means for advancing successively  
previously formed stays deposited in the said  
feeder, a guide-way into which the stays are  
15 deposited from the feeder, and a member  
movable in the guide-way adapted to engage  
and deposit the said stays into the twist-ers.

16. In a machine for making wire fabric,  
the combination with a series of sets of twist-  
20 ers mounted to travel in unison, of one or  
more movable stay feeders, a vertically mov-  
able member adapted to advance the stays  
from the feeder to the twist-ers, and means  
for inaugurating the movement of the twist-  
25 ers after the reception of the said stays.

17. In a machine for making wire fabric,  
the combination with a series of sets of twist-  
ers mounted to travel in unison, of one or  
more movable stay feeders, a vertically mov-  
30 able member adapted to advance the stays  
from the feeders to the twist-ers, means for  
guiding the stays into the twist-ers, and means  
for operating the twist-ers at intervals.

18. In a machine for making wire fabric,  
35 the combination with a revoluble frame, of a  
series of spaced sets of twist-ers mounted in  
the frame, means for actuating the said twist-  
ers, a stay wire feeder disposed above the  
frame, a vertically movable stay advancing  
40 member, and wire guides for directing the  
stays into the twist-ers during the movement  
of the frame.

19. In a machine for making wire fabric,  
the combination with a revoluble frame, of a  
45 series of spaced sets of twist-ers mounted in  
the frame, one or more stay feeders movable  
in a step by step movement, means for ad-  
vancing the stays from the feeders to the  
twist-ers, and means for actuating the said  
50 twist-ers.

20. In a machine for making wire fabric,  
the combination with a revoluble frame, of a  
series of rows of twist-ers mounted in the  
frame, the twist-ers of each row having a uni-  
55 form spacing, a drive for the twist-ers at each  
end of the frame, adapted to impart move-  
ment to each row of twist-ers at the same  
point in the travel of the frame, and means  
for feeding and depositing a stay wire to be  
60 received and engaged by the twist-ers of each  
row as they successively follow each other in  
the rotation of the frame.

21. In a machine for making wire fabric,  
the combination with a revoluble frame, of a

series of rows of twist-ers mounted thereon, 65  
mechanism disposed at each end of the frame  
adapted at intervals to impart power to the  
twist-ers, a stay retainer, and means for ad-  
vancing successively stay wires to be re-  
ceived and engaged by each row of twist-ers. 70

22. In a machine for making wire fabric,  
the combination with a revoluble frame, of a  
series of rows of twist-ers mounted thereon,  
driving mechanism disposed at each end of a  
row of twist-ers, interposed gearing between 75  
the drive mechanism and the said twist-ers,  
a stay wire retainer, and a feeder having an  
intermittent movement adapted to advance  
stays to the rows of twist-ers in their move-  
ment. 80

23. In a machine for making wire fabric,  
the combination with a revoluble frame, of a  
series of rows of twist-ers mounted thereon,  
driving mechanism disposed at each end of a  
row of twist-ers, interposed gearing between 85  
the driving mechanism and the said twist-ers,  
a stay wire retainer, one or more movable  
carriers for advancing the said stays, and  
mechanism for imparting an intermittent  
movement to the said carriers. 90

24. A feeder for stay wires for a fence mak-  
ing machine, comprising a wire stay retainer,  
a series of carriers mounted in the said re-  
tainer, means for intermittently moving the  
said carriers, and a plunger movable across 95  
the delivery end of the stay retainer.

25. In a fence machine, the combination  
with a series of twisting devices, of a wire  
stay retainer, one or more carriers mounted  
in the said retainer adapted to advance stay 100  
wires, means for operating the carriers, a  
member adapted to project the stays from  
the retainer to the twist-ers, and mechanism  
for intermittently actuating the said member.

26. In a wire fence machine, the combina- 105  
tion with a rotary frame, of a series of rows  
of twisting devices mounted in said frame,  
mechanism for actuating the twist-ers, stay  
feeding devices comprising an intermittent  
feed, plungers mounted at each end of the 110  
frame, a plate secured to the said plungers  
and extending across and movable up and  
down in front of the feed, and guides dis-  
posed between the feed and the twist-ers.

27. In a wire fence machine, the combina- 115  
tion with a rotary frame, of a series of rows  
of twisting devices mounted in said frame,  
mechanism for actuating the twist-ers, stay  
feeding devices consisting of a stay wire re-  
tainer, intermittent feeding devices in the 120  
said retainer, a member operatively mounted  
at the head of the retainer adapted to pro-  
ject stay wires into the path of the twist-ers,  
means for actuating the member, and guid-  
ing devices for insuring the placing of the said 125  
stays in the said twist-ers.

28. In a wire fence machine, the com-  
bination of a revoluble frame, a series of



rows of wire twisters mounted in said frame adapted to engage and advance a plurality of strand wires, a stay wire retainer supported with its delivery end above the said frame, means for advancing the stay wires in the retainer, a reciprocal member adapted to project the stay wires from the retainer to the said frame, guides overlying the path of travel of the twisters, adapted to direct the stays as they are received on the frame into the twisters, and means for operating the twisters to twist the strand and stay wires in transit.

29. In a wire fence machine, the combination of a revoluble frame, a series of rows of wire twisters mounted in said frame adapted to engage and advance a plurality of strand wires, a stay wire retainer supported with its delivery end above the said frame, means for advancing the stay wires in the retainer, a reciprocal member adapted to project the stay wires from the retainer to the said frame, guides overlying the path of travel of the twisters, adapted to direct the stays as they are received on the frame into the twisters, means carried by the said frame in proximity to the twisters of each row adapted to equalize the placing of the stays in the twisters, and means for operating the twisters to twist the strand and stay wires in transit.

30. In a wire fence machine, the combination of a revoluble frame, comprising a shaft, heads secured to the shaft, a series of pairs of supports secured to the heads, and provided at intervals with a series of wire slots and intermediate the slots with cut-out portions, a plurality of twisters mounted in the said supports coincident with the wire slots thereof, means for actuating the twisters, a stay wire feeder having its delivery end above the said frame and its twisters, means for advancing the stays from the feeder to the twisters, and a series of guides having portions overlying the revolving frame and adapted to coincide and enter the cut-out portions of the supports aforesaid, to facilitate in retaining the stays in the twisters until the same are actuated.

31. In a wire fence machine, the combination of a revoluble frame, comprising a shaft, heads secured to the shaft, a series of pairs of supports secured to the heads and provided at intervals with a series of wire slots and intermediate the slots with cut-out portions, a plurality of twisters mounted in said supports coincident with the wire-slots thereof, means for actuating the twisters, a stay wire feeder having its delivery end above the said frame and its twisters, a frame stationarily supported in advance of the feeder, together with the feeder forming a guideway between the same, means for projecting the said stays in such guide-way as the same are delivered

from the feeder, and a series of guides having portions overlying the revolving frame adapted to coincide and enter the cut-out portions of the supports aforesaid to facilitate in directing the stays into the twisters.

32. In a wire fence machine, the combination of a revoluble frame, a series of corresponding rows of twisters mounted in said frame, means disposed at one or both ends of the frame for actuating the said twisters, a stay wire feeder having its delivery end above the said frame, means for advancing stays in the feeder, a frame stationarily supported in advance of the feeder to form a guide between the said feeder and last mentioned frame, a reciprocally supported plate movable in the said guide way adapted to project stay wires from the feeder to the revoluble frame, members disposed at opposite ends of the revoluble frame to which the opposite ends of the plate are secured, and means having an intermittent engagement with the said members for raising and lowering the same and thereby reciprocating the said plate.

33. In a wire fence machine, the combination of a continuously driven shaft, heads supported on the opposite ends of the shaft, supports secured at their opposite ends to the heads, wire twisters mounted between the said supports, means disposed at one or both ends of the said supports for imparting movement to the twisters during the rotation of the frame, a stay wire retainer, means for advancing the stays in the retainer, a reciprocally supported member for projecting the stays from the retainer onto the frame, guides for directing the stays onto the twisters, plungers disposed adjacent to the heads aforesaid to which the opposite ends of the above said member are secured, and rollers attached to the aforesaid heads at suitable distances from each other adapted in the movement of the shaft and heads to engage and intermittently raise and lower the plungers aforesaid.

34. In a machine for making wire fabric, wire twisting devices movable in an endless orbit and adapted to simultaneously inter-twist portions of the body of a stay intermediate its ends to a series of intermediate strand wires and the opposite ends of the stay to the selvage wires.

35. In a machine for making wire fabric, a movable frame, means for feeding selvage and intermediate wires to said frame, means for placing a stay-wire lengthwise on the frame and across the strand and selvage wires, and means carried by the frame for simultaneously intertwisting the body of the stay to the intermediate wires and the opposite ends of the stay with the selvage wires.

36. In a machine for making wire fabric, a row of traveling twisting devices spaced at



graduated distances apart, means for leading line wires to the twisters, and means for moving a stay sidewise to present the same in the twisters for connecting it to the line wires.

37. In a machine for making wire fabric, a row of traveling twisting devices, means for leading line wires to the twisters, a stay-wire feeder with which the twisting devices intermittently coincide, and means for depositing a stay-wire in the twisters when the same coincide with the feeder.

38. In a wire fabric machine, a row of traveling twisting devices suitably spaced apart, means for leading line wires to the twisters, means for feeding a stay sidewise to present the same to the twisters, said stay-wire formed with a series of alternately disposed right-angle portions, and means for depositing the said stay in the twisters so that alternate parallel portions of the same will connect with the twisters and lie upon opposite sides of the row thereof.

39. In a machine for making wire fabric, the combination with a rotary drum, of means for feeding strand wires to said drum, and mechanism for connecting with said strand wires during the movement of the drum, the extremities and intermediate right-angle portions of stays laid upon said strand wires.

40. In a machine for making wire fabric, the combination with a rotary drum, of means for feeding strand wires to said drum, and mechanism for simultaneously connecting with said strand wires during the movement of the drum, the extremities and inter-

mediate right-angle portions of stays laid upon said strand wires.

41. In a machine for making wire fabric, a row of traveling twisting devices, means for leading line wires to the twisters, a stay wire container extending longitudinally with and having its delivery end above the path of movement of said twisters, and means for delivering stays to the twisters in transit.

42. In a machine for making wire fabric, a series of twisters adapted to travel in unison, means for leading a line wire to each twister, a container for stays fixedly mounted above the path of movement of said twisters, means for intermittently depositing stays across said line wires to be engaged simultaneously by said twisters, and means for operating the twisters to connect the stays and line wires in transit.

43. In a machine for making wire fabric, a series of twisters adapted to travel in unison, means for leading a line wire to each twister, a container for stays having a vertically disposed delivery portion mounted above the path of movement of said twisters, means for intermittently delivering stays across said line wires to be engaged simultaneously by said twisters, and means for operating the twisters to connect the stays and line wires in transit.

In testimony whereof we affix our signatures, in presence of two witnesses.

WILLIAM GRIMM.

WILLIAM F. DREXLER, JR.

Witnesses:

BEN HAUTER,  
JOHN GETZ, Jr.