No. 641,627. Patented Jan. 16, 1900.

E. HEUSCH.

MACHINE FOR MANUFACTURING SEWING NEEDLES.

(Application filed May 26, 1898.)

(No Model.) 5 Sheets—Sheet 1.

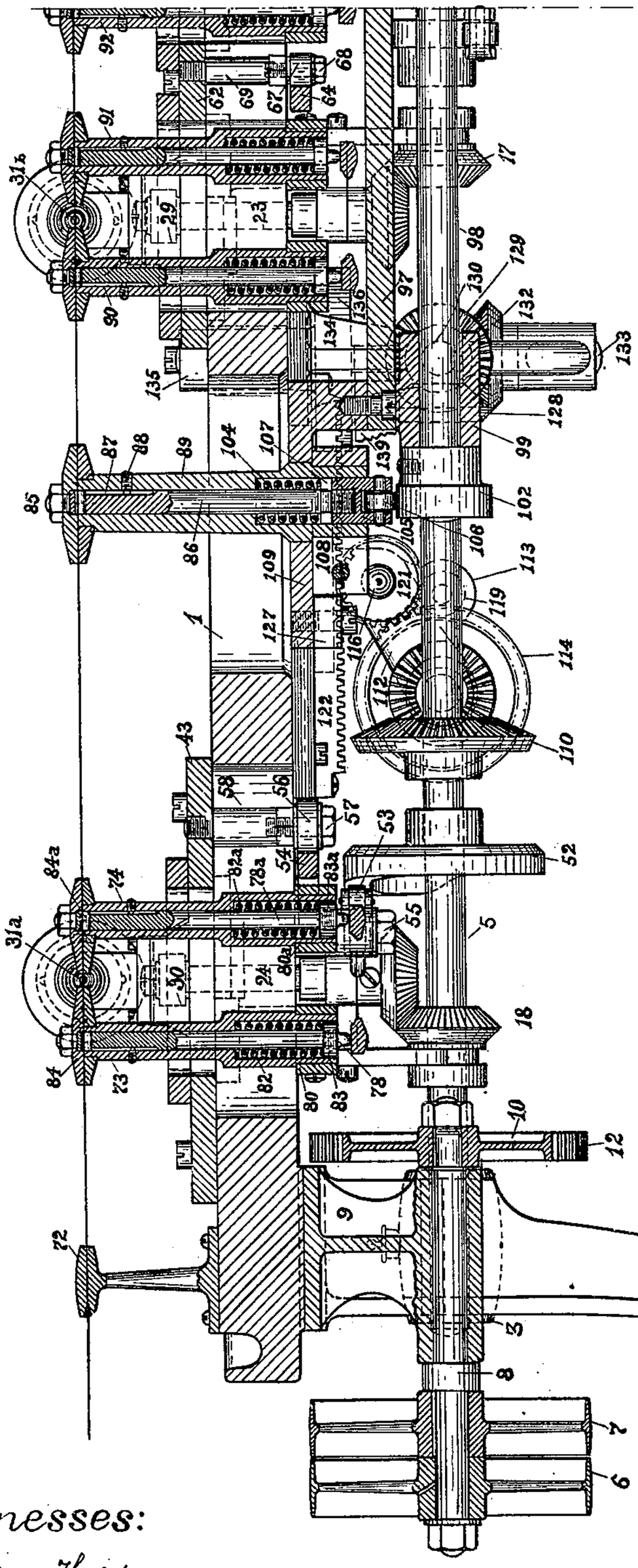

FIG. 1.

Witnesses:

Gustave Haider

Johann Beifel.

Inventor:

Edouard Heusch

per Martin Schmetz

Attorney.

No. 641,627. Patented Jan. 16, 1900.

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(Application filed May 26, 1898.)

(No Model.) 5 Sheets—Sheet 2.

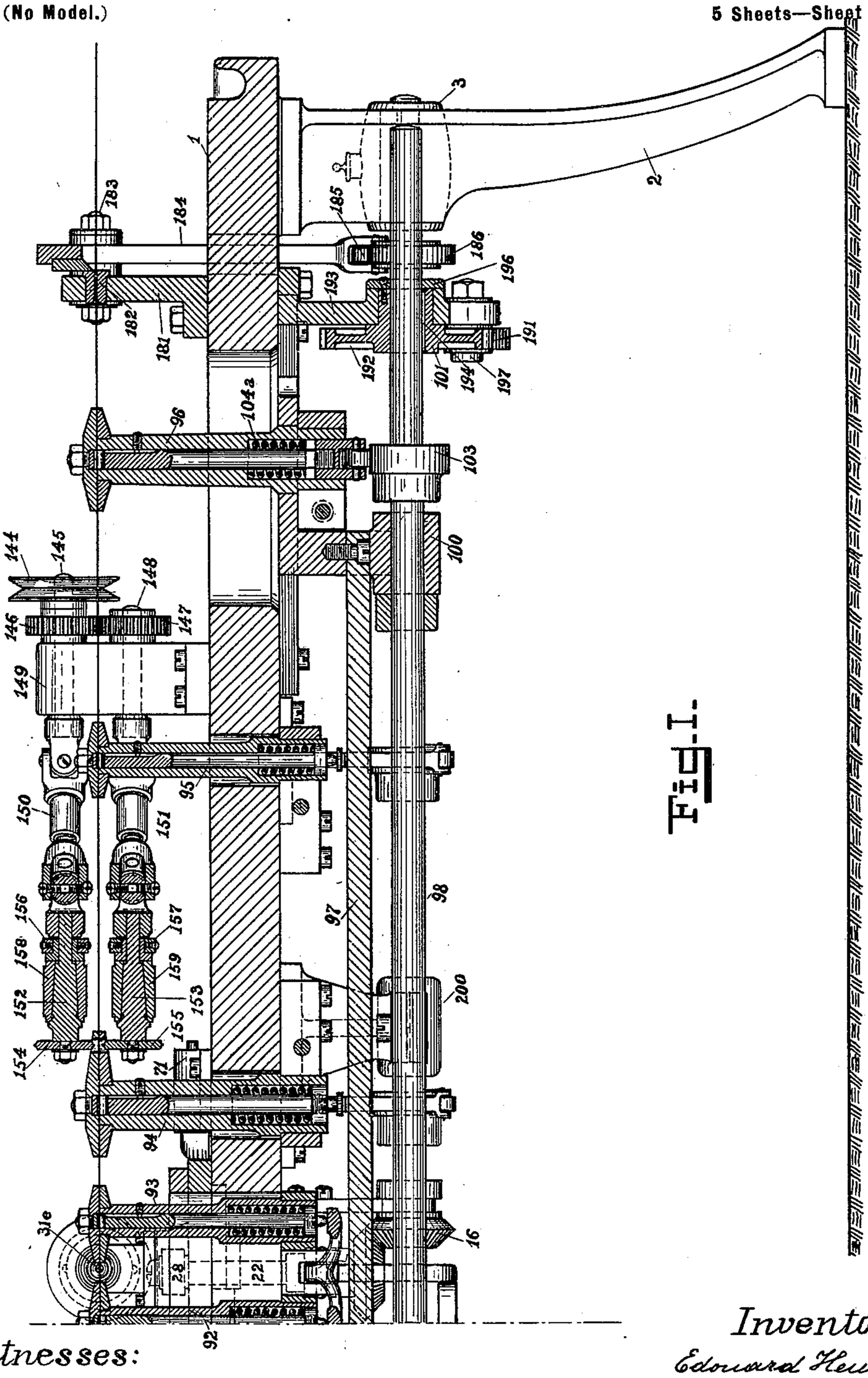

Fig. 1.

Witnesses:
Gustave Harder.
Johann Beifuel.

Inventor:
Edouard Heusch
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Attorney.

No. 641,627. Patented Jan. 16, 1900.

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MACHINE FOR MANUFACTURING SEWING NEEDLES.

(Application filed May 26, 1898.)

(No Model.) 5 Sheets—Sheet 3.

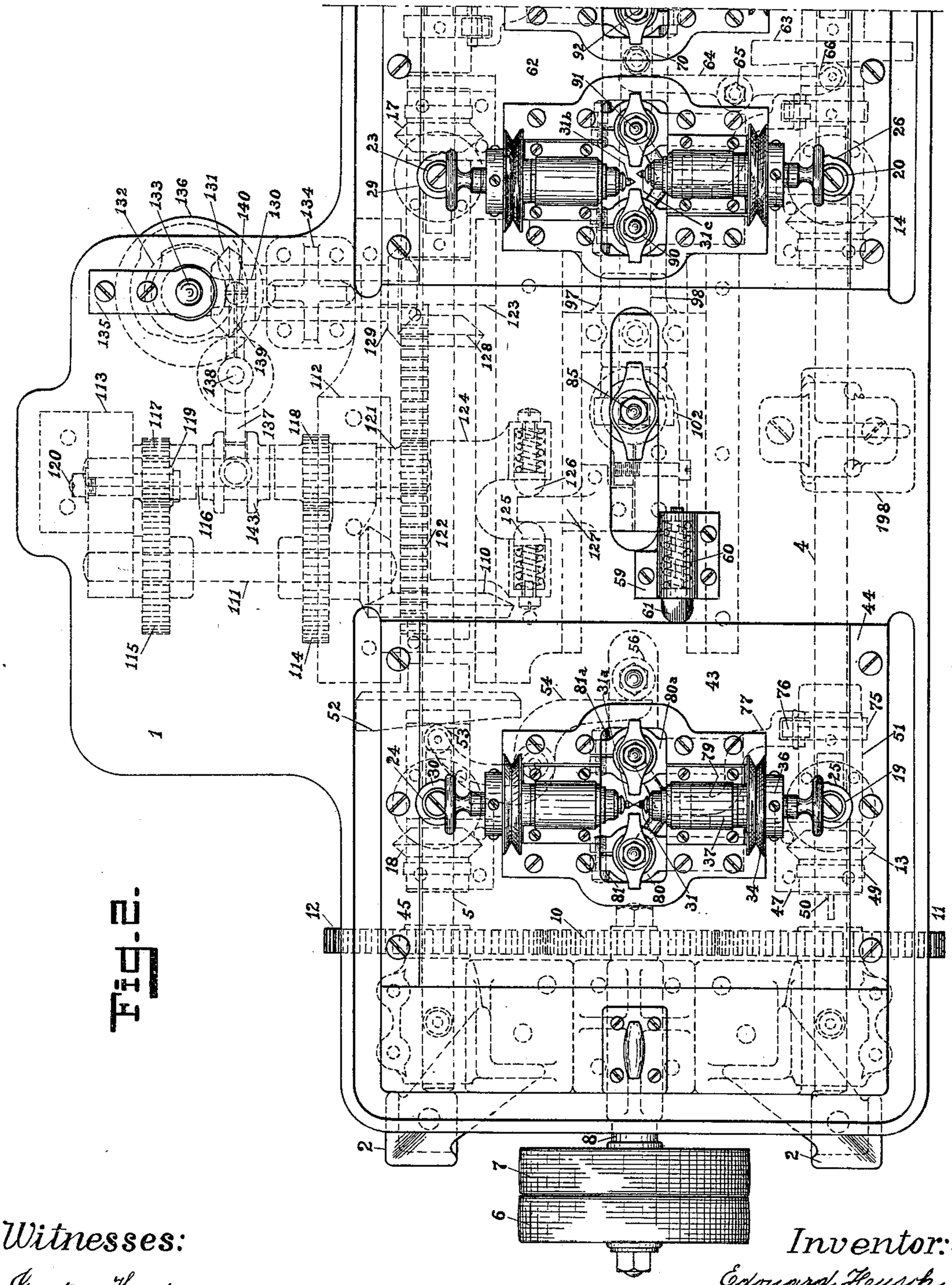

Fig. 2.

Witnesses:
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Johann Beisel.

Inventor:
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Attorney.

No. 641,627. Patented Jan. 16, 1900.

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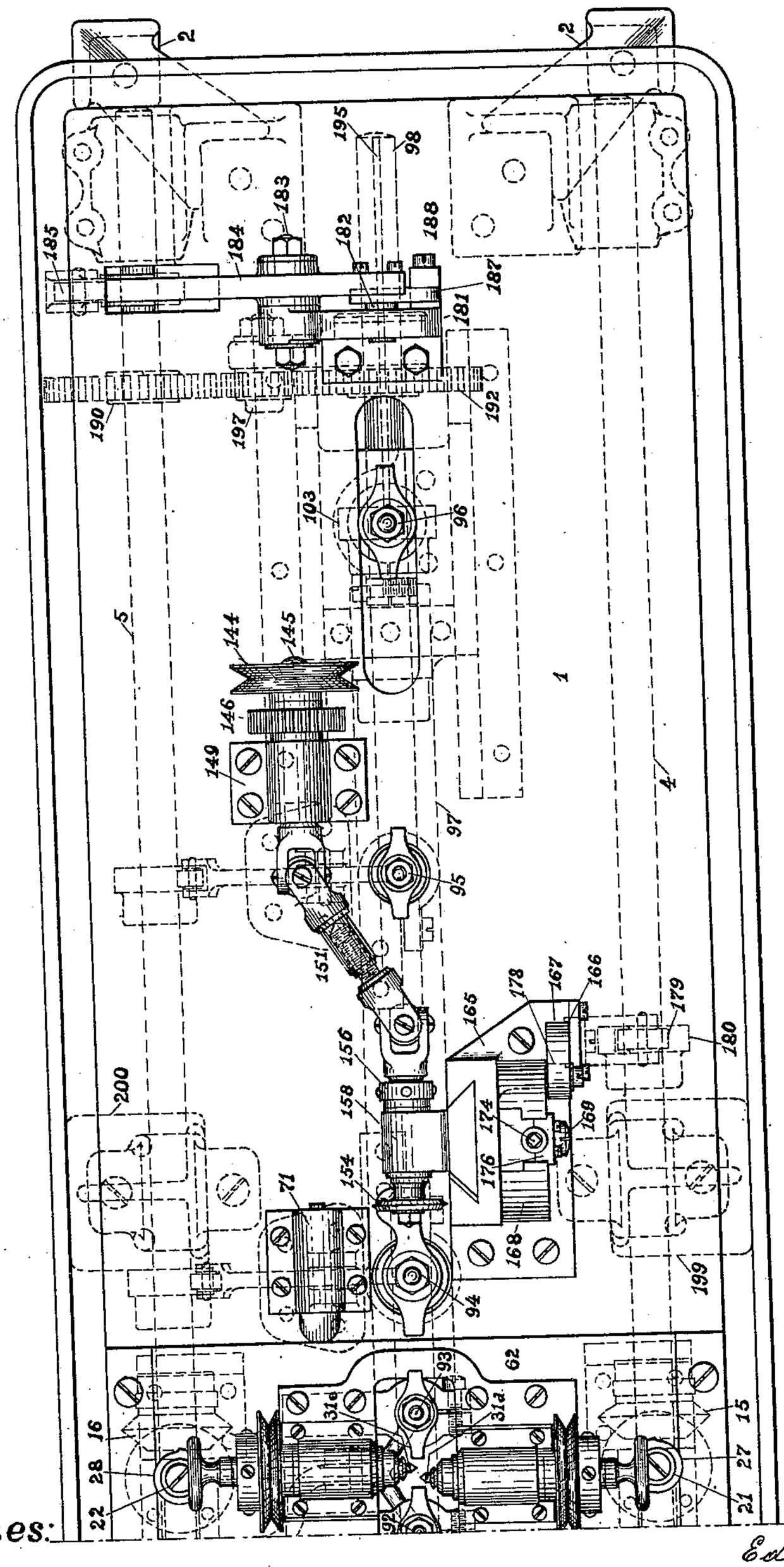
MACHINE FOR MANUFACTURING SEWING NEEDLES.

(Application filed May 26, 1898.)

(No Model.) 5 Sheets—Sheet 4.

Fig. 2.



Witnesses:

Gustave Harder.

Johann Reifsel.

Inventor:

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No. 641,627. Patented Jan. 16, 1900.

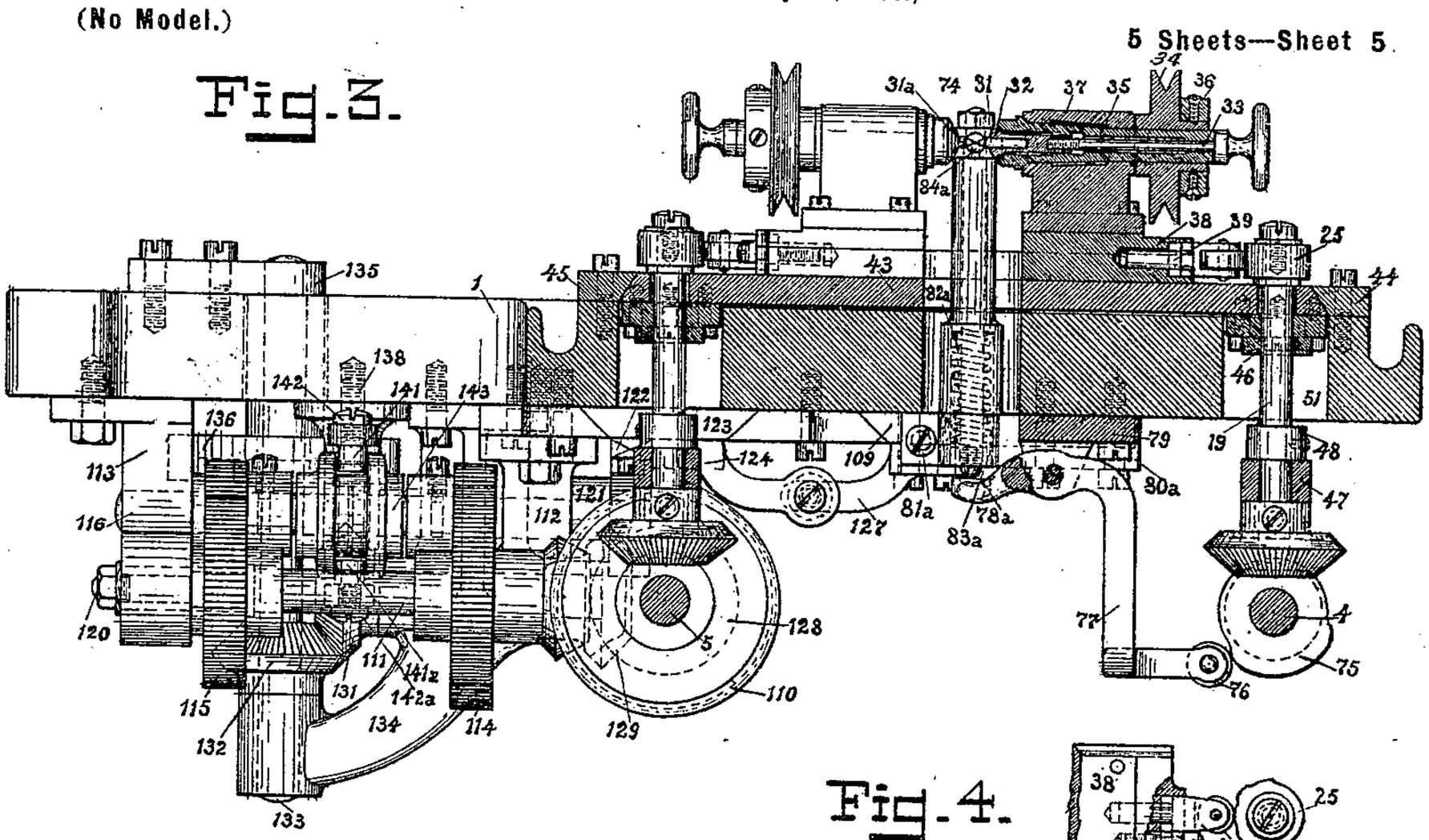
E. HEUSCH.

MACHINE FOR MANUFACTURING SEWING NEEDLES.

(Application filed May 26, 1898.)

(No Model.) 5 Sheets—Sheet 5.

Fig. 3.


34
31a
74
31
32
37
35
36
33
84a
38
39
25
44
43
82a
45
1
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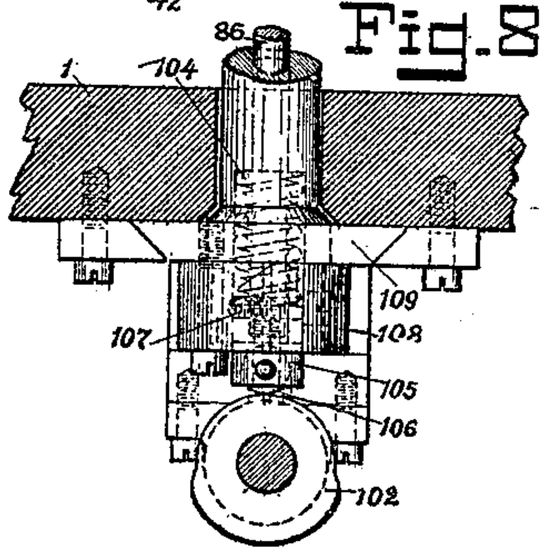
138
142
141
143
122
123
124
109
46
51
79
19
48
47
80a
81a
78a
83a
127
121
112
113
116
120
128
5
110
129
111
141a
142a
131
134
115
132
114
133
77
4
75
76

Fig. 4.

Fig. 8.



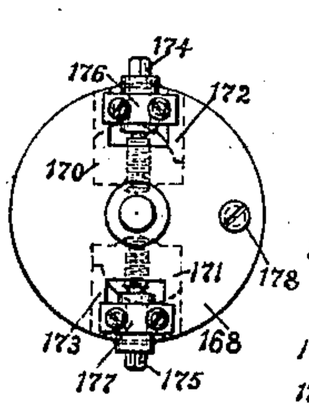


Fig. 5.

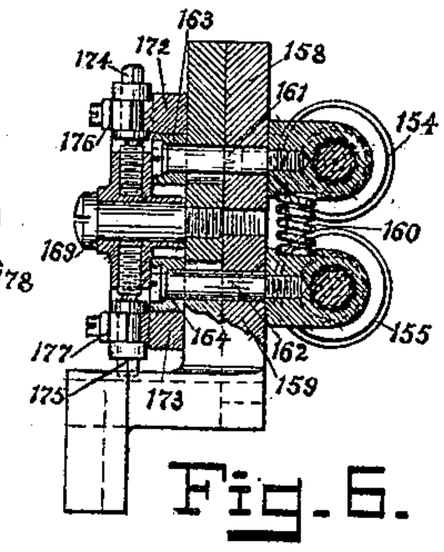


Fig. 6.

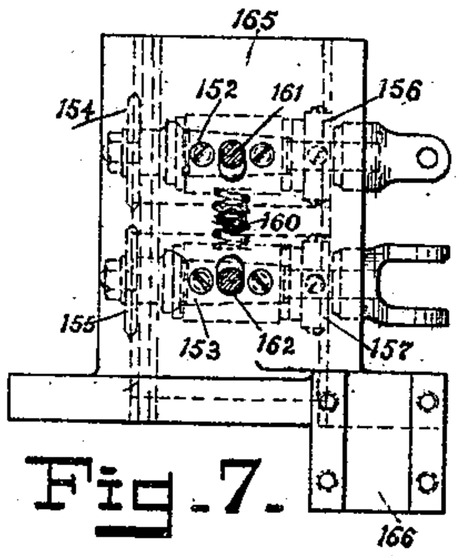


Fig. 7.

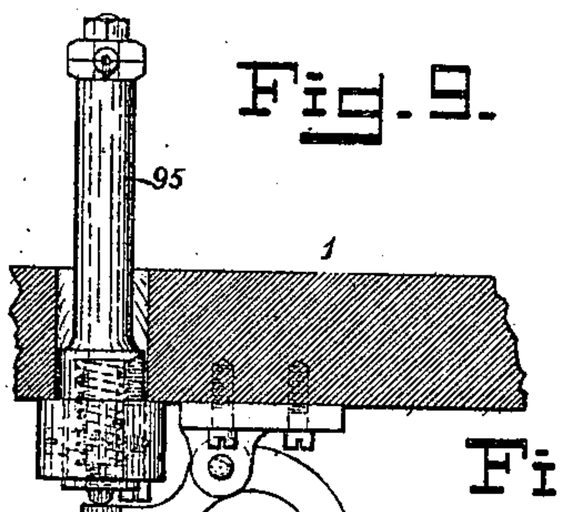


Fig. 9.

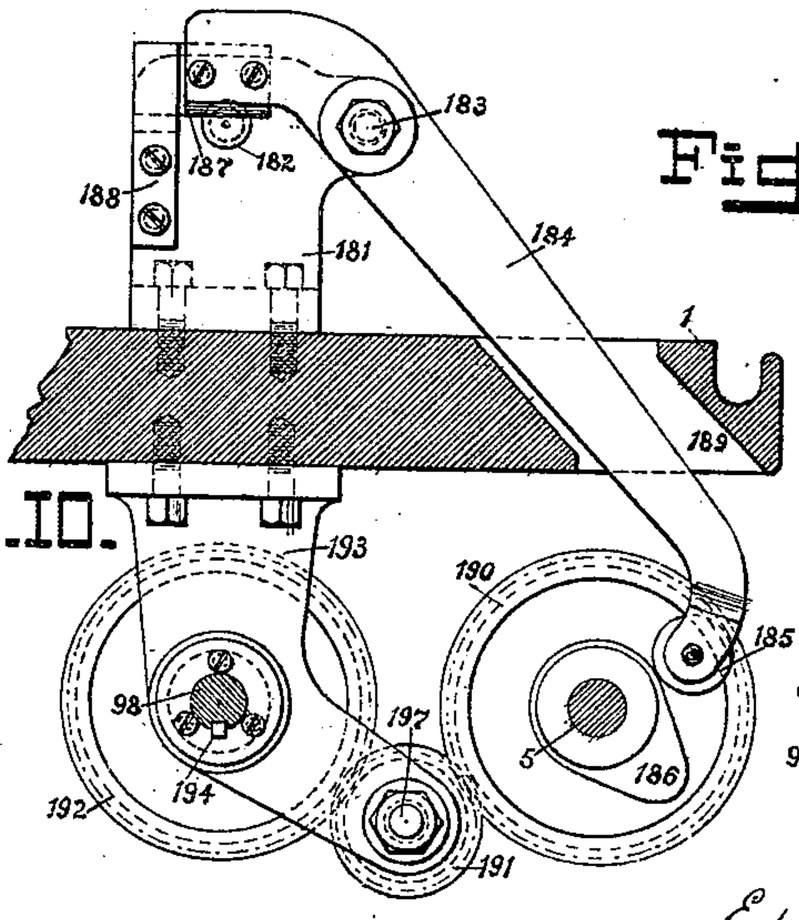


Fig. 10.

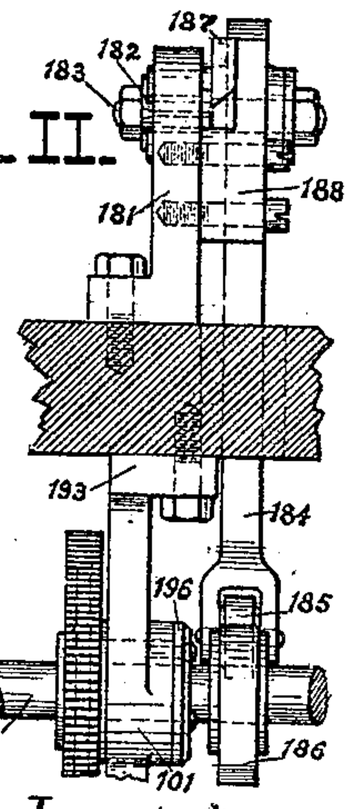


Fig. 11.

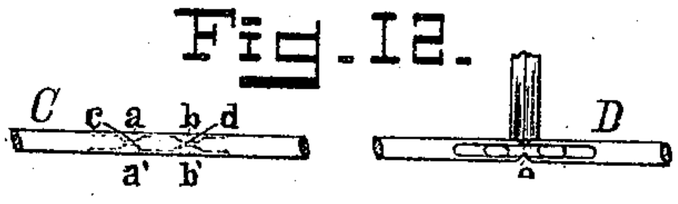
Witnesses:

Gustave Harder.
Johann Beisel.

Inventor.

Edouard Heusch
per Martin Schmetz
Attorney.

Fig. 12.



UNITED STATES PATENT OFFICE.

EDOUARD HEUSCH, OF PARIS, FRANCE.

MACHINE FOR MANUFACTURING SEWING-NEEDLES.

SPECIFICATION forming part of Letters Patent No. 641,627, dated January 16, 1900.

Application filed May 26, 1898. Serial No. 681,826. (No model.)

To all whom it may concern:

Be it known that I, EDOUARD HEUSCH, manufacturer, a citizen of Germany, residing at 255 Avenue Daumesnil, Paris, in the Republic of France, have invented certain new and useful Improvements in Machines for Manufacturing Sewing-Needles, reference being had to the accompanying drawings, forming part thereof.

My invention has relation to machines for manufacturing sewing-needles of continuous steel wire.

The construction of the machine allows of the eyes and grooves of the needles being finished by means of milling-cutters, which end was formerly achieved after a number of separate operations only—such, for instance, as cutting off the needle-shafts, straightening of the shafts, stamping of grooves, punching of eyes, grinding off the rough edges formed in the stamping and punching processes, and polishing of the several parts. All these operations are now carried out automatically by my machine.

The novelty consists in the construction, combination, and arrangement of the several parts coöperating to this common end, as will be hereinafter more fully described, and particularly pointed out in the claims.

In the drawings the same letters and figures of reference indicate the same parts of the invention.

In the drawings, Figure 1 is a longitudinal section of my machine along the line of feed of the wire. Fig. 2 is a top plan view of the same. Fig. 3 is an enlarged sectional view taken on the line A B of Fig. 1. Fig. 4 is an enlarged top plan view of a device to regulate the varying depth of the profile produced by the cutters. Fig. 5 is an enlarged view of the disk containing a device by means of which a pair of disk-shaped cutters are made to approach each other. Fig. 6 is an enlarged sectional view of said disk and parts connected therewith. Fig. 7 is an enlarged side view of the frame carrying said disk and disk cutters. Fig. 8 is an enlarged front view of a slide and unlocking device of one of a pair of tongs designed to carry at fixed intervals the steel wire the distance of two lengths of a needle forward. Fig. 9 is an enlarged view of one of the stationary tongs and its locking and unlocking mechanism. Fig. 10 is an enlarged end view of the cutting-off device and mode of transmitting power to the central shaft. Fig. 11 is an enlarged side view of the same. Fig. 12 shows an enlarged view of the needle after the first milling operation and another view of the same after the last milling operation.

The cast-iron table 1 and the legs 2 form the frame of the machine. The legs are bolted to the table and provided with fixed shaft-bearings 3, in which are journaled the side shafts 4 and 5. By means of the loose pulley 6 and the fast pulley 7 the machine is put in or out of motion. The bracket 9 is fastened to the under side of the table 1 and carries the short shaft 8. On one end of said shaft the pulleys 6 and 7 are mounted, and to its other end the gear-wheel 10 is keyed. Said gear-wheel meshes with the gear-wheels 11 and 12, keyed to the side shafts 4 and 5, respectively. Said shafts also carry the miter-wheels 13, 14, 15, 16, 17, and 18, all sliding on feathers. The vertical shafts 19, 20, 21, 22, 23, and 24 carry similar miter-wheels on their lower ends, meshing with the wheels sliding on the side shafts and held in gear by a suitably-constructed frame, which will be later on more fully described. These vertical shafts carry on their upper ends the disks 25, 26, 27, 28, 29, and 30, provided with a number of depressions and elevations suitable to serve a certain end in view, to be fully explained later on. As all the disks serve the same purpose and differ in the formation of their periphery only, a description of the operation of one disk in connection with the milling device will suffice.

Referring to Fig. 3, it will be seen that the vertical shaft 19 is set in motion by the miter-wheel 13^a, driven by the miter-wheel 13 on shaft 4, as shown in Fig. 2. The disk 25, being keyed to the vertical shaft 19, is obliged to take part in the rotation of the same.

Fig. 4 shows a profiled disk capable of imparting to a cutter sufficient motion to reach the deepest point in the wire. The resistance which the metal offers to the cutting edges of the cutter forces the cutter back as far as the depressions on the periphery of the disk permit.

The nature of the work requires that the

cutter must execute a compound motion—*i. e.*, it must be capable of moving in the line of its own axis and in a direction at right angles thereto. This is achieved in the following manner: The cutter 31 is inserted into a bushing 32, whose conical head contains four slots (not shown) in order to exert a positive hold on the shank of the cutter, when the head of said bushing is drawn up against the conical shoulder of the hollow spindle by the aid of the screw 33, which, to facilitate the operation, has been provided with a small hand-wheel. A cord imparts motion to the grooved pulley 34 and through it to the hollow spindle 35 and to the cutter 31. The longer part of the hub of said grooved pulley contains four slots,(not shown,) which permit of the grooved pulley being fastened to the hollow spindle and to afford means to take up any slack motion by the aid of the set-screws in the collar 36. The bracket 37 is mounted upon the intermediate piece 38 and carries the hollow spindle 35. Said intermediate piece slides in dovetailed guides and permits the cutter to move in a direction at right angles to the center line of the machine. In order to take up any wear, an adjustable plunger 39 has been mounted on the intermediate piece, carrying in its bifurcated end a friction-roller 40, and is provided with a shoulder 41, fitting without any play between shoulder and head of the set-screw 42, whereby an adjustment of the cutter is made possible.

In order to make a motion of the cutter in line with the axis of the machine possible, a pierced slide 43, sliding between the dovetailed guide-bars 44 and 45, has been mounted on the table 1. The vertical shaft 19 and all parts fastened thereto must take part in this motion. The fixed bearing 46 and the bracket 47 are both screwed to the under side of the pierced slide 43. The set-collar 48, on the one hand, and the hub of the miter-wheel, on the other hand, prevent an axial displacement of said vertical shaft. A plate 49, suitably fitting the groove in the hub of the miter-wheel 13, compels the latter to take part in the movement of the slide 43, because said plate is secured to the bracket 47 and the latter on the under side of said slide. A rotation of the miter-wheel 13 on the shaft 4 is prevented by the feather 50. Freedom of motion for the bracket 47 and the fixed bearing 46 is assured by the slot 51 in the table 1. In order that the slide 43 may move gradually forward, the following arrangement has been made: The shaft 5 carries a cam-disk 52, against which the friction-roller 53 bears. The lever 54, pivoted to the table by means of the bolt 55, carries on its bifurcated end said friction-roller 53, while its other end engages a friction-roller 56, revolving on the bolt 57. A heavy thimble 58 is screwed into the slide 43 and into said thimble the bolt carrying the friction-roller 56. Any motion imparted to the end of said lever carrying the friction-roller 53 will thus be transmitted to the slide 43. A suitable slot in the table allows said thimble the necessary amount of freedom. A device 59, containing a spring 60 and a plunger 61, is mounted on the upper side of the table and serves the purpose of returning the slide 43 to its starting-point.

The above description is also applicable to the slide 62. Here the cam-disk 63 imparts motion to the lever 64, pivoted to the table by the bolt 65. One end of said lever carries a friction-roller 66, always in contact with said cam-disk, and its other end bears against the friction-roller 67, revolving on the bolt 68. The thimble 69 is screwed into the slide 62, and into the lower end of said thimble said bolt 68 is screwed. The slot 70 in the table 1 provides room for said thimble to move freely therein. The device 71 returns the slide 62 in a similar manner as the device 59 the slide 43.

The steel wire used in the manufacture of needles enters through the mounted tube 72 and is then drawn through the heads of the stationary tongs 73 and 74. The stationary tongs are operated as follows: The cam 75, mounted on shaft 4, bears against the friction-roller 76, which is pivotally mounted in the bifurcated end of the lever 77. The other end of said leveris branched and both branches terminate under the protruding ends of the vertically-movable spindles 78 and 78ª of the tongs 73 and 74. The bracket 79 contains the pin which serves the lever 77 as fulcrum.

The clamps 80 and 80ª are screwed to the table and hold in their slotted ends the tubular casings of the tongs, which when correctly adjusted are securely held therein by tightening the set-screws 81 and 81ª. In these tubular casings held by said clamps move with limited freedom the spindles 78 and 78ª. Each spindle is provided with a small disk near its lower end and with a groove on its side near its upper end suitable to receive the point of a set-screw protruding through the side of the casing. Said screw-point hinders the spindle from acquiring any rotary motion while moving endwise. The upper end of each spindle carries the movable half of the head of the tongs, and just below it each spindle has a narrow slot through which the wire passes. The tubular casings carry the fixed halves of the heads of the tongs. Each half of said heads is provided with a shallow groove in which the wire rests. The pressure of the halves of the heads upon the steel wire is created by the springs 82 and 82ª, resting with their upper ends against shoulders in the inside of the tubular casings, and press with their other ends against said small disks 83 and 83ª at the lower ends of said spindles. If now the branched ends of the lever 77 press against the protruding points of said spindles, the springs 82 and 82ª will be compressed, the spindles 78 and 78ª, as well as the movable halves of the heads of the tongs, raised, and the steel wire released, as the

slots 84 and 84ª will not hinder this performance. As soon as the branches of the lever 77 cease to press upon the spindles said springs return all movable parts of the tongs to their first position, thereby securing the wire again. The vertical section of the tongs 85 shows the slot through which the wire passes, as well as the spindle 86, containing the slot 87, and the screw 88 in the tubular casing 89, which hinders said spindle of acquiring any rotary motion, more plainly.

As the tongs 90, 91, 92, 93, 94, and 95 are similarly operated as the tongs 73 and 74, it is thought the above description of the operation of the tongs will suffice.

The tongs 85 and 96 are coupled by the connecting-bar 97 and differ from the other tongs in minor details only. Here the heads of the tongs are provided with matrices to suit the milled profile of the wire, as shown under C in Fig. 12. With the aid of these matrices the heads of these tongs are able to take a firm hold of the wire and prevent thereby the rotation of the same. The shaft 98 is journaled in the bearings 99 and 100, as well as in the hub 101 of a gear-wheel. Said shaft carries the cams 102 and 103 for unlocking the tongs 85 and 96 at the precise moment, while the locking of the same is done by the springs 104 and 104ª, located in the interior of the respective tubular casings. To the lower end of the spindle 86 (see section of tongs 85) is screwed the cylindrical body 105, carrying the roller 106. The spindle is securely locked by the check-nut 107 in order to prevent an accidental separation of the spindle and the cylindrical body 105 through the action of the roller 106. Similar parts are contained in the tongs 96. The lower end of the tubular casing is firmly held by the clamp 108, screwed to the slide 109.

The tongs 85 and 96 have the mission to take hold of the wire, carry it forward, loosen their hold, and return to their starting-point. In order to execute the above operations, necessary to attain the end in view, the following means have been employed: The bevel-gear 110 upon the shaft 5 and the bevel-gear upon shaft 111 mesh together. The shaft 111 is journaled in the brackets 112 and 113 and carries the fixed gear-wheels 114 and 115. The same brackets contain also the bearings for the shaft 116, upon which revolve the gear-wheels 117 and 118. The points of the screws in the hubs of the wheels 117 and 118 project into the grooves cut into the shaft 116, and thus prevent a lateral displacement of said wheels. The gear-wheels 114 and 118 mesh with each other, whereas the gear-wheels 115 and 117 do so through the medium of the idler 119, pivoted to the bracket 113 by means of the stud 120. To the shaft 116 the pinion 121 is keyed, meshing with the rack 122, bolted to the dovetailed slide 123. The bracket 124 is secured to the slide 123, and its branches contain the spring-actuated plungers 125 and 126, which have the mission to annihilate any jerks which may occur in the transmission of motion. Between the two arms of the bracket 124 a tongue 127 is placed, transmitting any motion received from the bracket 124 to the dovetailed slide 109, to which it is screwed.

The clutch mechanism is operated as follows: The miter-wheel 128, keyed to the shaft 5, imparts motion to the horizontal shaft 130 by means of the miter-wheel 129 meshing with it. Said horizontal shaft carries on its other end a miter-wheel 131, meshing with a similar wheel 132, keyed to the vertical shaft 133. The bracket 134 contains the bearings of the shaft 130 and the lower bearing of the vertical shaft 133. The upper bearing of the vertical shaft is formed by the bracket 135. On the upper end of the vertical shaft the disk 136 is mounted, containing in its face a curvilinear groove, which will impart at fixed intervals a certain motion to the lever 137. The bolt 138, screwed into the table, acts as fulcrum to said lever. To one end of said lever a leaf-spring 139 is bolted, which ends in the finger 140 reaching into the curvilinear groove in the face of the disk 136. The other end of the lever 137 is branched and provided with the friction-rollers 141 and 141ª, which revolve upon the prolonged shanks of the screws 142 and 142ª, screwed into the ends of said branches. The clutch 143 is mounted on the shaft 116, and its faces are provided with fine teeth (not shown) suitable to engage similar teeth (not shown) on the faces of the hubs of the gear-wheels 117 and 118. Said friction-rollers of the lever 137 enter the central groove of the clutch, and the latter is thus controlled by said lever. It will be seen that said clutch will be compelled to engage either the hub of the wheel 117 or the hub of the wheel 118, or neither—*i. e.*, take up a neutral position. The different phases of action of the clutch are of course wholly depending on the curvilinear slot in the face of the disk 136. (See Fig. 2.) If the clutch engages the wheel 118, the rack 122 and all parts receiving their motion through it will move in a certain direction. The wheel 117, being not engaged now, revolves without hindrance on the shaft 116; but as soon as the clutch ceases to engage the hub of the wheel 118 and is forced to engage the hub of the wheel 117 the wheel 118 cannot any more influence the shaft 116, which now is under the influence of the wheel 117, and as the wheel 117 meshes not directly with the wheel 113, but receives its motion from the idler 119, it is clear that the shaft 116 must now revolve in the same direction as the shaft 111, or, in other words, in the opposite direction to that, while the clutch was engaging the hub of the wheel 118. It is therefore evident that the rack 122 will now travel in the opposite direction and the desired back and forward motion of the coupled tongs 85 and 96 is thus obtained.

As the shaft 111 and the wheels 113 and 114, mounted thereon, always revolve, the wheels

117 and 118, meshing with the former indirectly or directly, are compelled to revolve also; but the shaft 116 will at intervals cease to revolve, and with it the coupled tongs 85 and 96. These intervals of rest depend entirely on the shape of the curvilinear groove in the face of the disk 136, as will be readily understood.

The disk cutter device operates as follows: A cord-driven pulley 144, a gear 146, and a part of a universal joint are rigidly mounted on the shaft 145, journaled in the bracket 149, secured to the table 1. In the same bracket the shaft 148 is journaled, carrying on one end the wheel 147, meshing with the wheel 146, and on its other end a part of a universal joint. The universal joints 150 and 151 are connected with the tapered spindles 152 and 153, and so adapted to drive the disk cutters 154 and 155. Said tapered spindles are journaled in the dovetailed slides 158 and 159 and armed with set-collars 156 and 157 to take up any slack in their bearings. The spiral spring 160 always tends to separate said slides. The shouldered screws 161 and 162, provided with the friction-rollers 163 and 164, are screwed into said slides. The bracket 165, bolted to the table 1, contains a slideway adapted to receive the slides 158 and 159 and an arm provided with a slideway 166 of rectangular section, adapted to receive the bar 167. To said bracket the oscillating face-plate 168 is pivotally mounted on bolt 169. This face-plate contains in its slots 170 and 171 devices by means of which the disk cutters can be made to approach each other in the following manner: In the slots 170 and 171 are adjustably mounted the eccentric blocks 172 and 173 in contact with the friction-rollers 163 and 164. Said blocks have slotted shoulders, fitting without play between the collars of the adjusting-screws 174 and 175 and the set-collars fastened thereon. The adjusting-screws are held to the eccentric blocks by means of the caps 176 and 177. On the face of the face-plate the friction-roller 178 is mounted and encompassed by the forked end of the bar 167. Said bar carries on its lower end a friction-roller 179, always in contact with the cam 180, mounted on the shaft 4. Any motion imparted to the bar 167 by the cam 180 is transmitted to the face-plate, whereby the eccentric blocks are made to approach each other and with them the disk cutters 154 and 155, which now will cut the incisions into the wire, as shown in Fig. 12 at *e*. As soon as the influence of the cam ceases to act the spiral spring 160 returns all moving parts into their former position.

The cut-off device is constructed as follows: The bracket 181 is rigidly mounted on the table and contains in its upper part a hardened-steel bushing 182. The orifice of the steel bushing is slightly enlarged where the wire enters. A lug of said bracket firmly holds the stud 183, upon which the lever 184 is fulcrumed. Said lever carries on one end a friction-roller 185 in contact with the cam 186 and on the other end a detachable knife 187. The small bracket 188 guides the extension of the knife and forces the knife to be always in sliding contact with the face of the steel bushing, thus preventing bending of the wire instead of cutting it, which otherwise would take place when the knife becomes dull and the mechanism worn. Said lever is raised by the cam 186 and lowered by the difference in weight of the two arms of the lever.

Figs. 10 and 11 show the means by which the central shaft receives its motion. The gear-wheel 190, keyed to the shaft 5, meshes with the idler 191, with which the wheel 192 meshes. The bracket 193 is rigidly bolted to the under side of the table. The hub 101 of the wheel 192 is journaled in this bracket, and its rotation on the shaft 98 is prevented by the feather 194, moving in the keyway 195 of said shaft. A collar 196, secured to the hub of the wheel 192, prevents said wheel from taking part in the forward-and-backward motion of the shaft 98. The idler 197 revolves on the bolt on the bracket 193.

The detachable brackets 198, 199, and 200 prevent any deflection of the shafts 4 and 5.

The machine operates as follows: After all cams and disks have been adjusted and the parts operated by them act at the precise moments the wire is drawn through the small tube 72 and the heads of the tongs 73 and 74 the machine is set in motion. The set of cutters mounted upon the slide 43 commence to mill a profile into the wire, as shown under C in Fig. 12. A moment before this operation ceases the coupled tongs 85 and 96 return and the tongs 85 takes a firm hold on the wire. As soon as this is done the tongs 73 and 74 unlock and the coupled tongs 85 and 96 go forward and reach their extreme point of travel an instant before the milling-cutters have milled another profile into the wire, and the operation as above described is repeated. After this operation has been executed several times the tongs 90, 91, 92, 93, 94, and 95 are taking part in the operation in the same manner and at the same moment as the tongs 73 and 74. It will be noticed that the wire used in the process is always firmly held by one or the other of the two kinds of tongs, and therefore a twisting of the wire made impossible. It will be noticed in Figs. 1 and 2 that the milling-cutters in the two sets of cutters arranged on the slide 62 are not placed opposite each other, as the cutters 30 and 31ª. The distance between the two sets of cutters is equal to two lengths of a needle, and the centers of each pair of cutters offset equal to a distance from center to center of the needle-eyes. The end in view is to pierce the partitions *c* and *d*, Fig. 12, still remaining after the first milling operation and to give a finish to these parts. After the wire has been introduced into the tongs 90 and 91 the cutter

31[b] reduces the partition *c* a certain amount and finishes and polishes the eye of the needle by *a*, while the cutter 31[c] executes the same operation on the partition *d* at *b'*. After the wire has been forwarded a distance equal to two lengths of a needle and therefore entered the tongs 92 and 93 the cutter 31[d] removes the remaining parts of the partition *c* and finishes and polishes the eye of the needle at *a'*, while cutter 31[e] removes the remainder of the partition *d* and finishes the eye of the needle at *b*. Another cycle of operations of the coupled tongs 85 and 96 introduces the wire into the tongs 94. The head of this tongs consists of halves with hook-shaped extensions, which support the wire at both sides of the disk cutters in order to give the wire the necessary support when the disk cutters make the incisions in the wire, as shown in Fig. 12 at *e*. Succeeding cycles of operations of the coupled tongs introduce the wire first into the tongs 95 and then into the tongs 96, which in unison with the tongs 85 introduces the wire into the cut-off device. This cut-off device is operated by the above-described mechanism when the coupled tongs reach their extreme point of travel, which takes place when the tongs 96 is just the length of a needle removed from the edge of the knife. After the needle-shafts have been cut off the points are ground on in the usual manner.

It will be understood that various mechanical modifications may be made without departing from the spirit of my invention.

What I claim, and desire to secure by Letters Patent, is—

1. A machine for manufacturing sewing-needles comprising in combination with a set of milling-cutters 31 and 31[a] adapted to finish the grooves on the needle-shafts completely and the eyes of the needles in part, brackets wherein the adjustable spindles carrying said cutters are journaled; adjustable dovetailed intermediate pieces, whereon said brackets are mounted, containing devices adapted to adjust the cutters when wear takes place; rotating profiled disks influencing the cutters so as to mill the desired depressions into the needle-shaft means for rotating said profiled disks, a pierced dovetailed slide 43 moving lengthwise of the table and at right angles to the axis of the cutters, means to advance and means to return said slide, tongs to hold the wire during the milling operation and means for locking and unlocking said tongs at the precise moment substantially as described and illustrated.

2. A machine for manufacturing sewing-needles, comprising in combination with two sets of milling-cutters consisting of the cutters 31[b], 31[c], 31[d] and 31[e] of which 31[b] and 31[c] as well as 31[d] and 31[e] are offset equal to the distance from center to center of two adjacent needle-eyes and the two sets of cutters separated by two lengths of a needle, adapted to finish and polish the eyes of the needles, brackets wherein the adjustable spindles carrying the said cutters are journaled; adjustable dovetailed intermediate pieces whereon said brackets are mounted, containing devices adapted to adjust the cutters when wear takes place; rotating profiled disks influencing the cutters so as to remove the partitions left standing after the first milling operation and to finish the eyes of the needles, means for rotating said profiled disks, a pierced dovetailed slide 62 moving lengthwise of the table and at right angles to the axis of the cutters, means for advancing and means for returning said slide, tongs for holding the wire during the second milling operation, and means for locking and unlocking said tongs at the precise moment, substantially as described and illustrated.

3. A machine for manufacturing sewing-needles, comprising in combination with sets of milling-cutters adapted to mill the eyes of needles; brackets wherein the adjustable spindles, carrying said cutters, are journaled; adjustable dovetailed intermediate pieces, whereon said brackets are mounted, containing devices adapted to adjust said cutters when wear takes place; rotating profiled disks to influence said cutters, means for rotating said disks, slides adapted to move lengthwise of the table, means for advancing and means for returning said slides, tongs to hold the wire during the milling operation, means for locking and unlocking said tongs at the precise moment, tongs whose head consists of halves with hook-shaped extensions supporting the wire close to the disk cutters 154 and 155, disk cutters driven by means of universal joints and journaled in slides capable of being made to approach and separate from each other, an oscillating face-plate containing the mechanism causing the approach of said slides and the cutters mounted thereon, means for forcing said parts asunder, means for actuating said oscillating face-plate and means for driving said universal joints, substantially as described and illustrated.

4. A machine for manufacturing sewing-needles, comprising in combination with sets of milling-cutters adapted to mill and polish the eyes of needles; brackets wherein the adjustable spindles, carrying said cutters, are journaled; adjustable dovetailed intermediate pieces, whereon said brackets are mounted, containing devices adapted to adjust said cutters when wear takes place; rotating profiled disks to influence said cutters, means for rotating said disks, slides adapted to move lengthwise of the table, means for advancing and means for returning said slides, tongs to hold the wire during the milling operations, means for locking and unlocking said tongs at the precise moment, a pair of coupled tongs adapted to take hold of the wire at fixed intervals, carry it forward, release their hold on the wire and return to their starting-point; means for causing these motions comprising a shaft 111 receiving its motion by means of angle-wheels from the

shaft 5, wheels mounted on shaft 111 imparting motion to the wheels on shaft 116, a pinion keyed to the shaft 116 and meshing with a rack secured to a dovetailed slide 123, a two-armed bracket 124 containing in its two arms spring-actuated plungers adapted to insure a gentle transmission of motion to the tongue 127 secured to the dovetailed slide 109 upon which the tongs 85 is mounted, a disk provided with a curvilinear slot adapted to influence one end of the lever 137 at certain intervals in such a manner so as to cause the other end encompassing a clutch on shaft 116 to engage the wheels loosely mounted thereon alternately; means for rotating the central shaft carrying the cams for unlocking said coupled tongs and means for preventing the wheel 192 to take part in the back-and-forward motion of said shaft, substantially as described and illustrated.

In testimony that I claim the foregoing as my invention I have signed my name in presence of two subscribing witnesses.

EDOUARD HEUSCH.

Witnesses:
EDWARD P. MACLEAN,
PAUL F. PÁQUET.