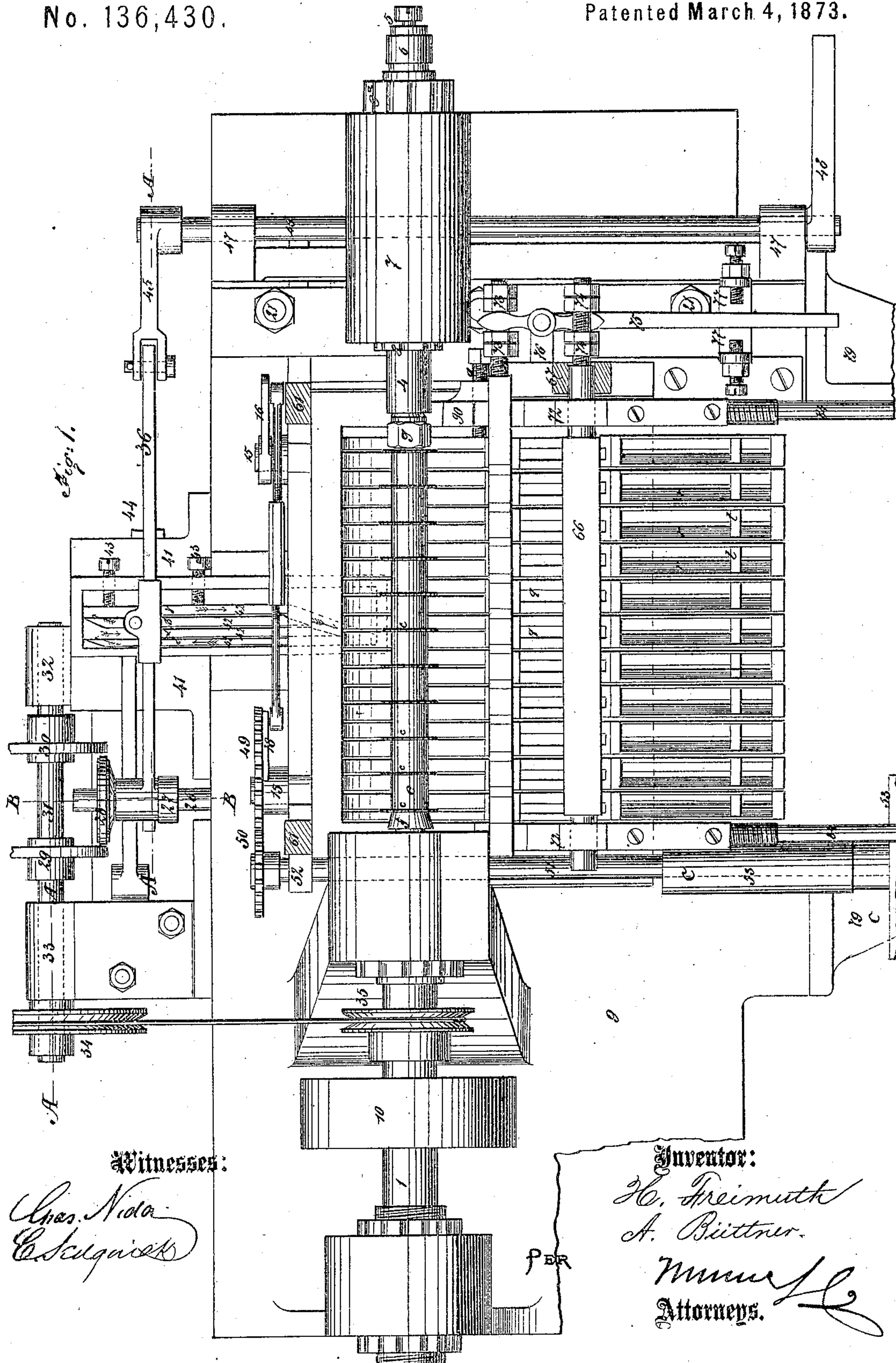


H. FREIMUTH & A. BUTTNER.

Machines for Grooving Sewing-Machine Needles.

No. 136,430.

Patented March 4, 1873.



Witnesses:

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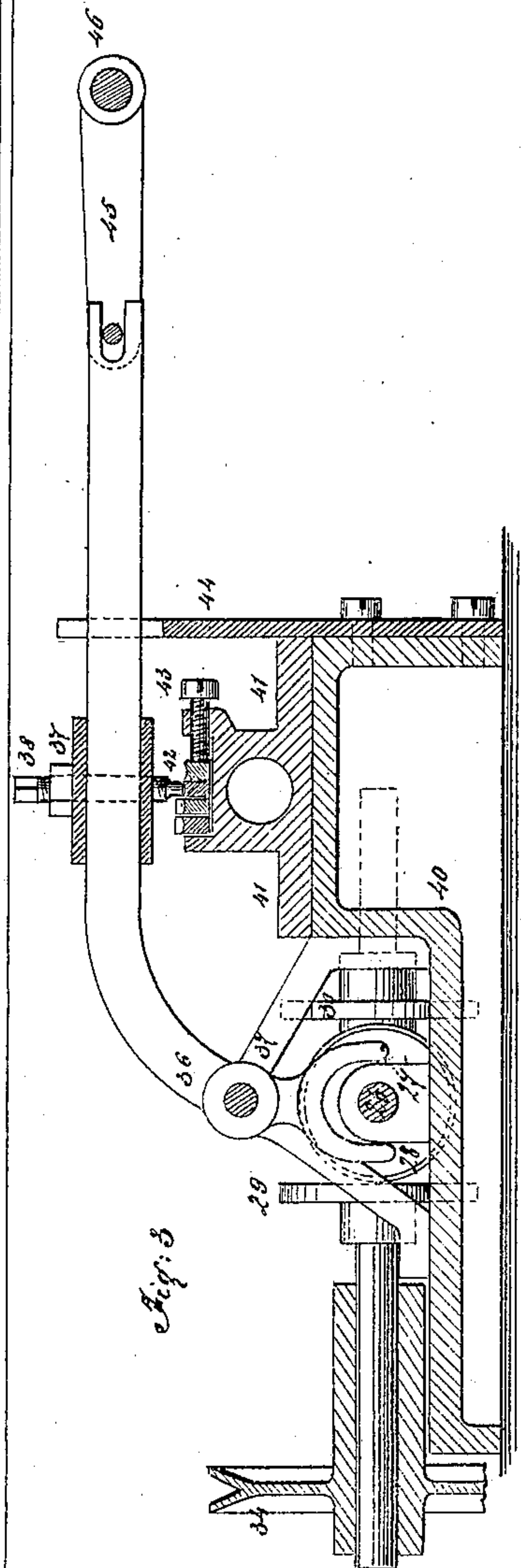
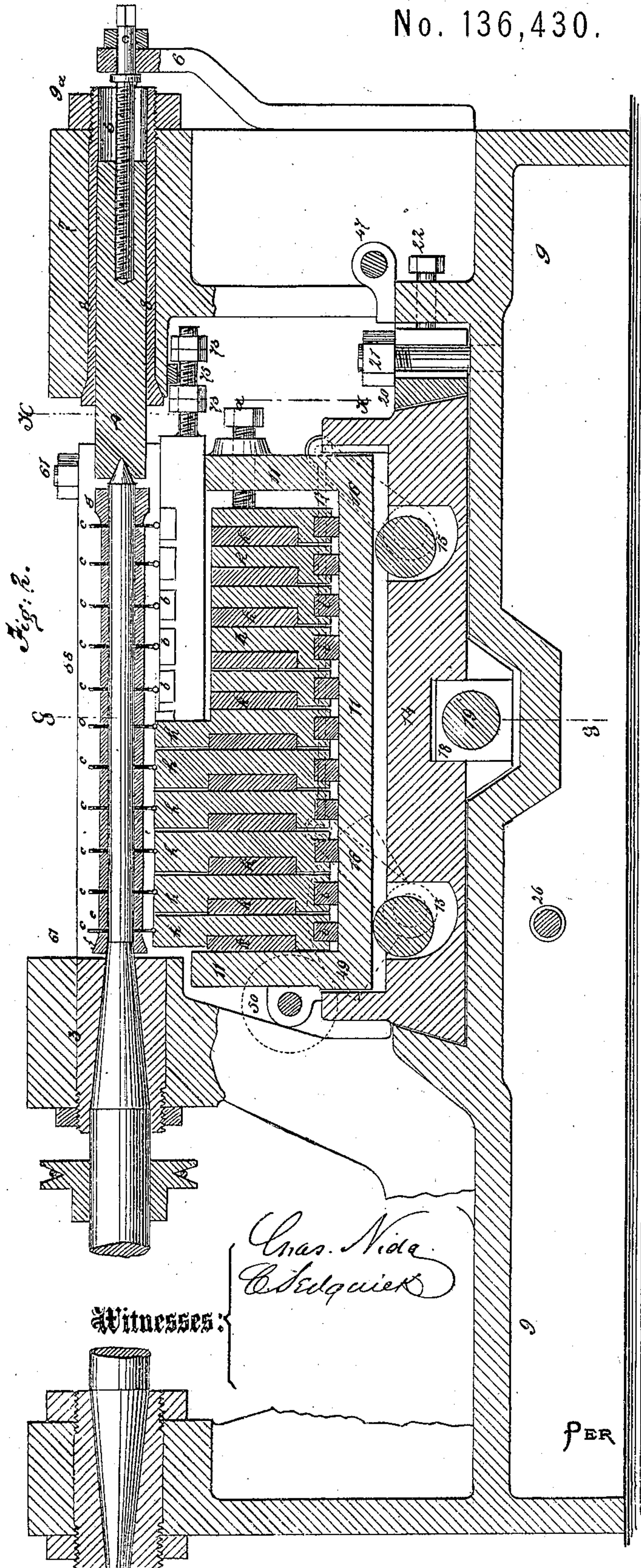
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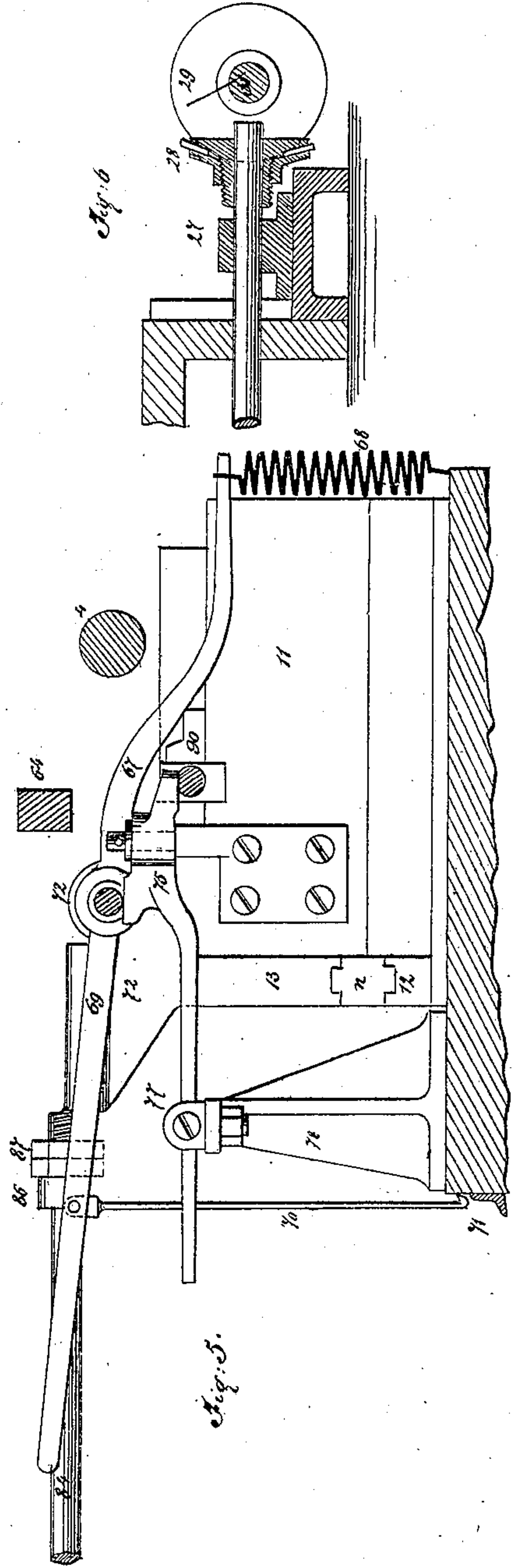
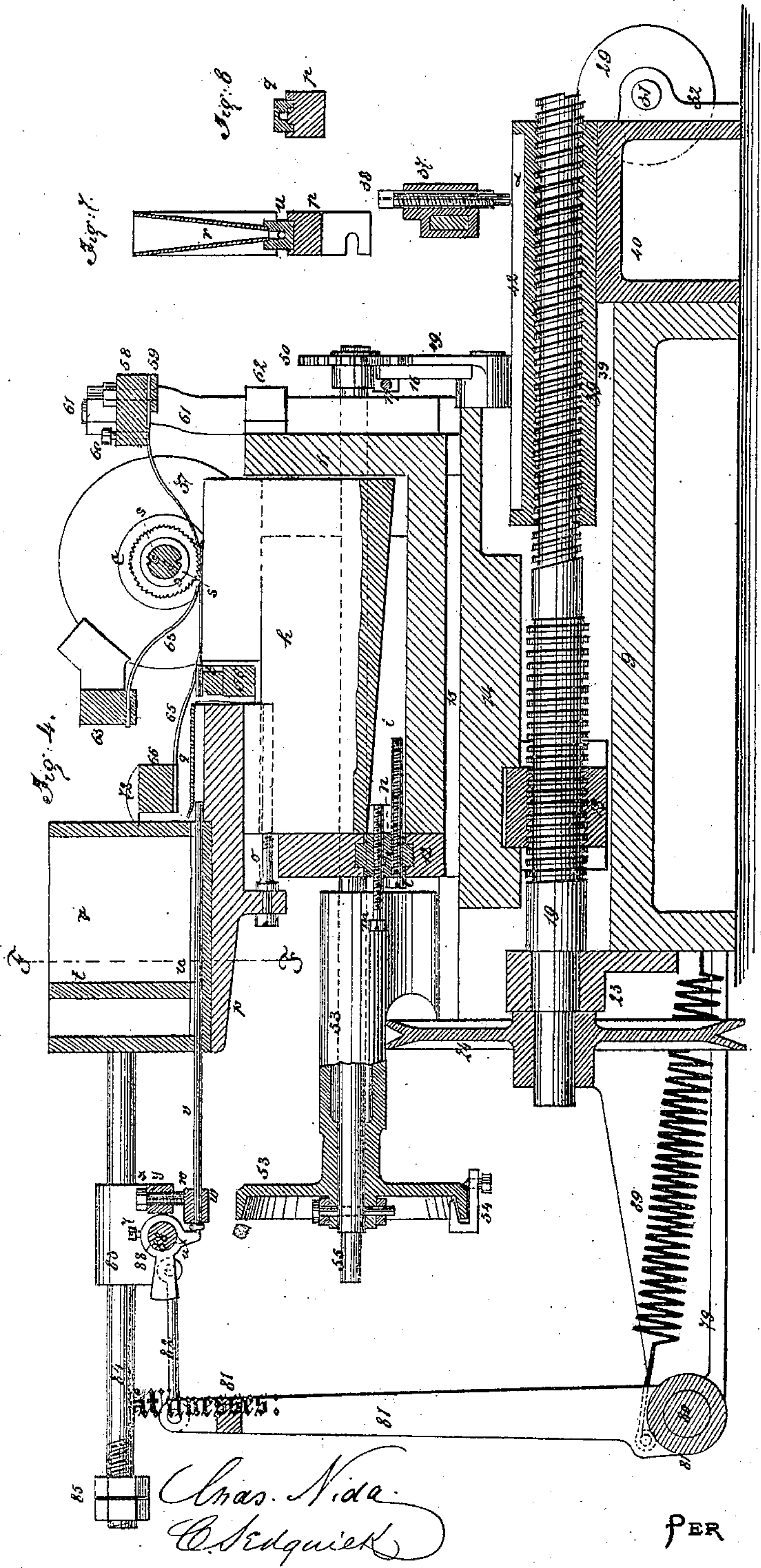
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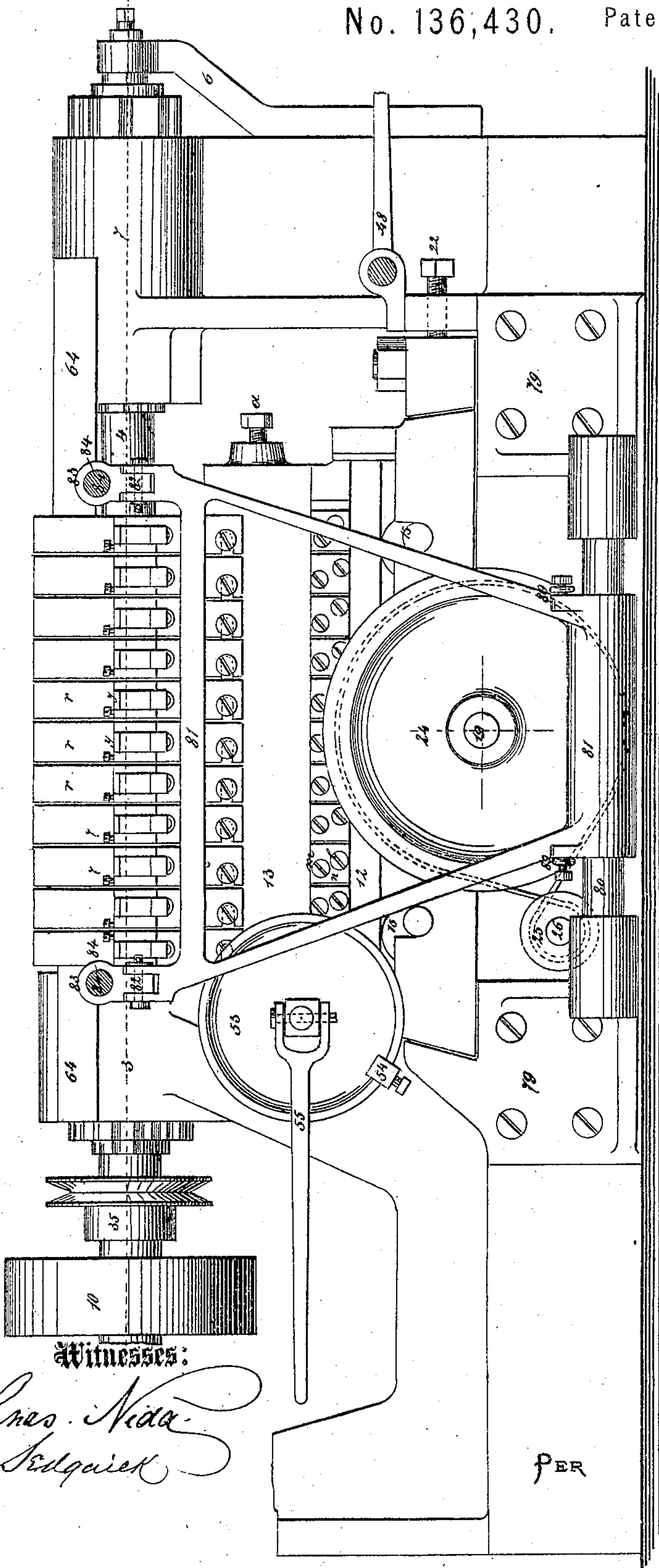
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Fig. 9.



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Fig. 11

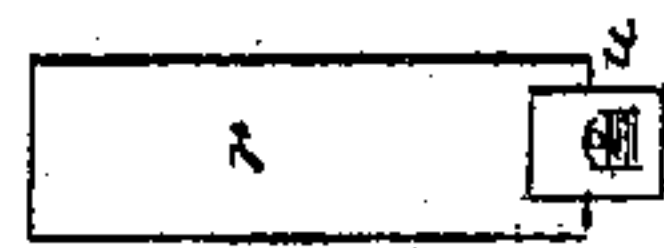


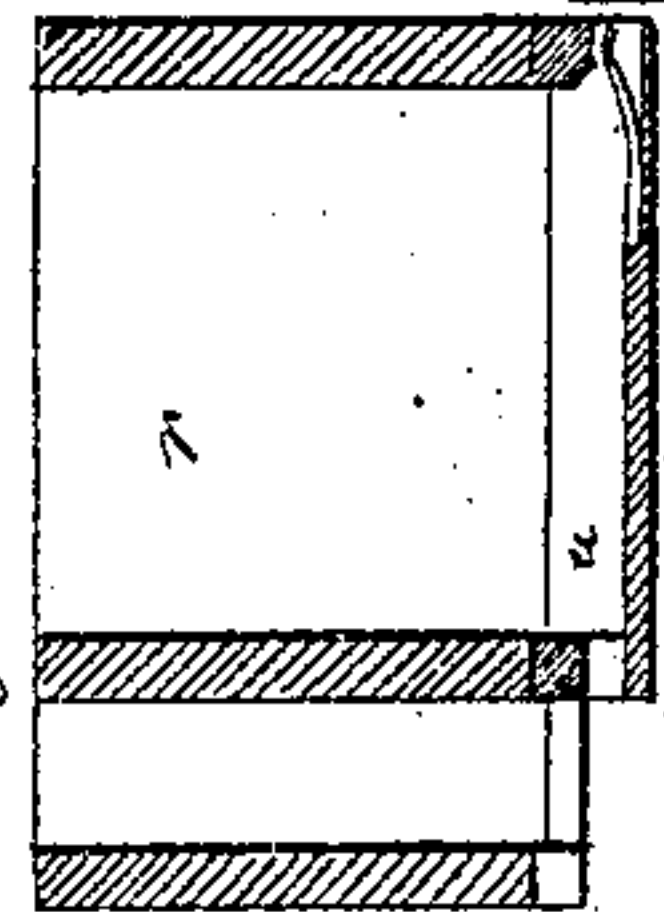
Fig. 13



Fig. 12



Fig. 10



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UNITED STATES PATENT OFFICE.

HEINRICH FREIMUTH AND AUGUST BÜTTNER, OF AACHEN, PRUSSIA.

IMPROVEMENT IN MACHINES FOR GROOVING SEWING-MACHINE NEEDLES.

Specification forming part of Letters Patent No. 136,430, dated March 4, 1873.

To all whom it may concern:

Be it known that we, HEINRICH FREIMUTH and AUGUST BÜTTNER, of Aachen, in the Kingdom of Prussia, have invented a new and Improved Machine for Grooving Sewing-Machine Needles, of which the following is a specification:

Figure 1 is a plan of the machine. Fig. 2 is a longitudinal section. Fig. 3 is a section at the lines A A A A in Fig. 1. Fig. 4 is a cross-section on the line G G in Fig. 2. Fig. 5 is a side view and section along the line H H, Fig. 2. Fig. 6 is a section along the line B B in Fig. 1. Fig. 7 is a section along the line F F in Fig. 4. Fig. 8 is a parallel section to Fig. 7 through the two parts *p* and *q*. Fig. 9 is a front elevation of the machine. Figs. 10 and 12 are longitudinal sections through modified parts, which answer the like marked parts in Figs. 4, 7, and 8. Figs. 11 and 13 are end views of the same parts.

Similar letters of reference indicate corresponding parts.

The invention consists in the improvement in machines for grooving needles, as herein-after described and pointed out in the claims.

The spindle 1 is borne at one end in the two conical beds 2 and 3, and at the other end it is centered into the end of the cylinder 4. This cylinder 4 is fitted into the hollow cylinder 8, and can be retracted by the screw 5, which is supported in the bracket 6, as shown. By this screw the cylinder 4 can be drawn so far as to permit the spindle 1 to be furnished with cutters and rings. The hollow cylinder 8 is conical at one end, fits into a correspondingly conical end of cylinder 7, and is provided with a slitted mouth-piece, which equally at its mouth is conically bored out. By turning the nut 9^a the slit conical mouth-piece of 8 is drawn between 7 and 4, and is compressed, and thus the bolt 4 is fixed in a position exactly concentric to the boring of cylinder 7. 9 represents the common base-plate of the heads 2, 3, and 7. The spindle 1 is revolved by the pulley 10. Upon this spindle are secured several circular cutters, *c c c*, which are separated and held a certain distance apart by the hollow cylinders or washers *e e*. The cutter nearest the head 3 is supported by the ring *f*, which is set upon the cone of the spindle. The last cut-

ter on the other side is fixed by the nut *g*, which presses together all the cutters and washers. It is necessary and essential that the intermediate pieces *e e* be of a certain length, and that they fit accurately upon the spindle in order to keep the cutters in an exact perpendicular position to the spindle, the more so because the cutters from hardening may be not exactly straight. If the cutters exceed a certain number it is necessary to prevent them from loosening and turning on the spindle. This is effected by cutting in the spindle two or any other number of grooves, *s s*, Fig. 4, longitudinally, in which are caught some inward projections, either of the cutters or of the washers, or both. Under every cutter is placed a saddle, *h*, with a groove, in which the needle is put. All the saddles *h h* lie together in a case, 11. The saddles can all be moved laterally by a key or wedge, *k*, and vertically by a key or wedge, *i*. The movement of the keys *k k* is effected by the screws *o o*; that of the keys *i i* by the pressing-screws *m m* and the tug-screws *l l*, which both are fitting in the slides *n n*. The face of the case 11 consists of the two pieces 12 and 13, which are screwed on 11, and between which the slides *n n* can move. The movement of the saddles *h h* by the keys is necessary in order to bring all the needles accurately under the cutters, and to make all the grooves equally deep, although the cutters may have unequal diameters. All the saddles *h h* are fixed in their positions by the pressing-screw *a*, thus pressing them all together. The case 11 is movable up and down between the ridges of the slide 14. This movement is effected by two cylinders, 15 15, which lie in bearings of the slide 14, with eccentric end pins, as shown. These pins carry cranks 16 16, which are connected by the bar 17, of adjustable length, in order that both cylinders raise and lower the case 11 in an absolute parallel manner. In the lower side of the slide 14 is held a nut, 18, in which a screw-spindle, 19, is secured. By this spindle the slide 14, and with it the case 11, is adjusted. The slide 14 is dovetailed between a bar that is formed on the base-plate 9 and a bar, 20, which is fixed, by screws 21 and 22, to the base-plate, as shown in Fig. 2. One end of the spindle 19 turns in the socket 23, which

is screwed on the framing 9, and bears a cord-pulley, 24, worked by a cord from the smaller pulley 25, that is at one end of the cross-axle 26, whose other end turns in the slide-bearing 27, and provided with a friction-disk, 28. This disk 28 is in its middle position almost in contact with the friction-disks 29 and 30, that are fastened on the axle 31, which is driven by the cord-pulley 34 from the pulley 35 of the spindle 1. In order to move the slide 14, and with it all the needles, forward or backward, or to stop it, it is sufficient to bring the disk 28 in contact with 29 or with 30. This can be effected by the lever 36, which has a point of support in the pillar 37, and seizes with a fork the bearing 27, if its other end is moved up and down. Now, as a crank, 45, drops with a pin into a slit of the lever 36, which crank 45, as well as the crank-handle 48, is on the common axle 46, the workman can in a very convenient and easy manner move the slide 14 forward or backward, or stop it, by only pressing the lever 48 up or down, or holding it in a middle posture. Instead of making all the movements of the lever 36 by hand, the machine can be made to accomplish some of them automatically. The back half of the spindle 19 has for that purpose a screw-thread of greater rising than its front in order that the nut 39 may travel further and faster than the slide 14. In the upper part of this nut 39 are lying four small tracks, 42 42, (see Fig. 3,) each having a slightly concave surface, in which the pin 38 can slide along, resting in the slide 37 of the lever 36, and can also move transversely to the spindle 19. The tracks *a* and *B* answer for the forward-and-back motions for cutting the short groove; the tracks *j* and *J* the same for cutting the long groove. These four tracks are provided with elevations and depressions in order to give the lever 36, and therewith the slide 14, the intended motion. The tracks 42 are fixed by the screws 43, and can be exchanged and adapted to every sort of needles. 44 is a stationary guide for the lever 36. This total apparatus is fixed on the frame 40, which is screwed or fastened to the base 9. The nut 39 is dovetailed between the rails 41 41. The mechanism for lifting and lowering the case 11 consists of the following parts: 49 is a sector of a cog-wheel fixed on the eccentric pin of one of the cylinders 15, together with one of the above-mentioned cranks 16. It gears into the cog-wheel 50, which is fastened on the axle 51. This transverse axle is held in the bearings 52 and 53, and carries in front the jointed lever 55. The bearing 53 is fastened on the slide 14, and is enlarged in front to form a disk, on the flanged periphery of which cramps or lugs 54 can easily be fixed in any convenient posture. Pressing down the lever 55, both cylinders 15 are turned, and thus the case 11 is lifted, whereupon the lever 55 is fixed by pressing it behind one of the cramps or lugs 54. The number of such cramps is usually two, to enable an adjustment both

for the deeper and the shallower part of the needle-groove. The needles are held fast as follows: Under the free parts of all the needles there is a bar, 56, which, at the points in contact with the needles, is fitted with wood, leather, or other soft material. Each needle is from above pressed upon its support by three springs—the fore part by the spring 57, the back part by the spring 65, and the middle part by the spring 63. All the springs 57 are attached to the bar 58, which is connected with the slide 14 by two pillars, 61 61. These pillars 61 61 are held to the case 11 by straps 62 62. The springs 57 57 are adjusted by the screws 60 so as not to press upon the needles, unless the case 11 is lifted. The same is the case with the springs 63 63, which are all screwed to the bar 64, this latter being fastened at the heads 3 and 7. The spring 63 will press, therefore, always upon that part of the needles which is next to the cutters, while the springs 57 and 65 hold the fore and back parts of the needles invariably secured. All the springs 65 65 are attached to a bar, 66, which is held by the two pieces 72 72 in such a manner that it can be turned as well as moved lengthwise. The pieces 72 72 are fixed on the case 11. Upon the prominent part of 66 is sitting a lever having the two arms 67 and 69, as in Fig. 5. The spiral spring 68, in drawing down the arm 67, presses the springs 65 upon the needles; but the workman, pressing upon the arm 69, and overcoming the power of the spiral spring, can lift the springs 65. This position can be fixed by latching the link 70 attached to 69 in the hook 71. If both grooves of a needle are to be cut one after the other, it is necessary to turn the needle one hundred and eighty degrees round its axis after the first groove has been made. This turning is effected as follows: The bar 56 lies upon the sides of the case 11, in such a manner that it is movable between the pieces 72 72 and 90 90. The end of this bar 56 is fitted with a screw-thread and four nuts, 73 73. Equally the bar 66 is fitted with nuts 74 74. Between these nuts a double-armed lever, 75, is applied in such a manner that it has its fulcrum 76 fixed at the case 11, in the midst of the two bars 56 and 66. The workman, turning it on this axle, shoves the bars 56 and 66 in opposite directions, and rolls thus the needles one hundred and eighty degrees round their axes, but leaves them in their relative places to the grooves in the saddles *h h*. By varying the stroke of the lever 75 the motion of turning the needles can be varied, this stroke being limited by the adjusting-screws 77 77, which are put in the framing 78, fixed upon the slide 14.

All the needles are simultaneously applied to their places in the following manner: Upon the saddles *h h* are fastened the projecting pieces *p p*. On the fore parts of these are sitting in grooves the furrowed pieces *u u*, and on these the reservoir *r r*. The reservoirs are contracted downward in such a degree that from each reservoir no more than one needle

can fall into the furrow of *u*. This needle is then shoved forward by the pin *v* to its proper position in the saddle *h*. The little bridge on the channel *q*, secured to *p*, serves to secure the direction of the needle on the way between *r* and *b*.

The Figs. 10, 11, 12, and 13 show modifications of these parts, the mouths of *u u* and *q q* being contracted by little springs; for if the needles have large butt ends and thin shafts it frequently happens that two shafts together are shoved into the mouth of *u*. This is prevented by the spring in *u*, that leaves space only for one shaft. The other spring lying in *q* does not allow the needle to push against *b*. The depth of furrow in *u* is to be regulated to the thickness of the needles.

All the pins *v v* are headed, and stick in the shells *w w*, and these are fastened by the screws *x x* at the forks *y y*, which latter, all together, are fixed by the screws 77 on the round link or rod 88. On the same rod hangs, between the shanks of each fork *y y*, a two-armed piece or double crank, *u'*, movable in such a manner that the lower arm presses against the head of the pins *v*, with which it is in line. The rod 88 is supported at the ends in bearings 83, which are sliding on the bars 84 84. In order to effect this sliding in a convenient manner the sockets 83 83 are connected by the two little connecting-rods 82 82 with a frame, 81, which hangs and can be turned on its axle 80 that hangs in the two bearings 79. These latter are fixed to the base-plate 9.

The two spiral springs 89 89 tend always to move the frame 81, and with it the link 88 and all the pins *v*, toward the middle of the machine.

The nuts 85 85 and 87 87 limit the motion of the bearings 83 83. Elastic rings 86 are placed upon the rods 84 in front of the nuts 87, for purposes hereinafter set forth.

Before beginning the operation the state of the machine is as follows: The case 11 is let down, the slide 14 is in the foremost position, answering to the length of the needle-grooves, the lever 36 is in the middle position and the gearing of the spindle 19 thereby stopped, the lever 69 is pressed downward and fixed, and the frame 81 is drawn back by the springs 89. The operative now draws back the frame 81, and from each reservoir *r* one needle will fall into its furrow *u*. Giving way, now, to the frame 81 and to the force of the springs 89 89, all these needles will be pushed forward by the pins *v* till they arrive at their right places. If one or more of these pins should be hindered in their motion, the double-armed piece *u'* works as an expedient of safety, turning itself around 88, and not pressing further on the pin-head. After that the lever 69 is let go, which forces the springs upon the needles, and thus the needles are fixed. Thereafter the workman lifts the case 11 by means of the lever 55, which brings the springs 57 and 63, and soon after the cutters, in contact with the needles. Pressing, now, the lever 48 down,

the workman throws in gear the screw-spindle 19, which moves the slide, when the same commences to make a groove in the needles. As soon as this is long enough the pin 38, moving hitherto in the track *a*, sinks, and effects thereby a reversing of the slide-gear. At the same time the workman lets down the case 11, and by displacing the lever 75 he revolves and turns over all the needles. The case 11 is then once more raised. Meanwhile the slide is returned to its first position, and is fixed in this by the pin 38, which is lifted into the middle position, sliding on the track 3, or by a body directly opposite to the movement of the slide. The workman, again pressing down the lever 48, begins the second grooving. Within one grooving the depth of the groove can be altered by fixing the lever 55 in another position. The second groove being finished, the slide returns and stops accurately, the same as after the first grooving. The lever 69 is now to be pressed down and fixed, and the case 11 to be let down. Lastly, the workman throws out all the needles simultaneously by drawing the lever 81 toward himself and permitting it to spring back, in consequence of which operation the bearings 83 83 bound against the elastic rings 86 86, and the pins *v v* are struck by *u'*, which throws out all the needles.

The machine then is in the same state in which it was at the beginning of the work, and ready to repeat the whole operation.

The advantage of this machine is clear. It consists in the grooving of many needles simultaneously instead of one, as hitherto. At the same time the construction is such as will make the work sure and all the operations quick and convenient.

If any of the cutters have become unserviceable, the furnishing of needles to them is stopped by drawing out the corresponding pins *v*, or by turning about the corresponding pieces *u'*, while the other cutters continue to work, till it seems more profitable to renew them all.

Having thus described our invention, we claim as new and desire to secure by Letters Patent—

1. The combination, as described, of the friction-disks 28, 29, and 30 with the slide 14, in the manner and for the purpose set forth.
2. The arrangement of the three bearings 2, 3, and 7 for the main spindle 1, for the purpose of preventing irregular movement of the same, in the manner described.
3. The saddles *h h* and keys *i i* and *k k* in the case 11, arranged for adjusting the needles separately, in the manner described.
4. The double cranks *u'*, arranged on the rod 88 to operate on the pins *v*, as set forth.
5. The combination of the parts 81, 82, 83, 84, 86, and 88 with each other, substantially as and for the purpose set forth.

Aix-la-Chapelle, September 21, 1872.

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Witnesses:

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