

No. 654,737.

Patented July 31, 1900.

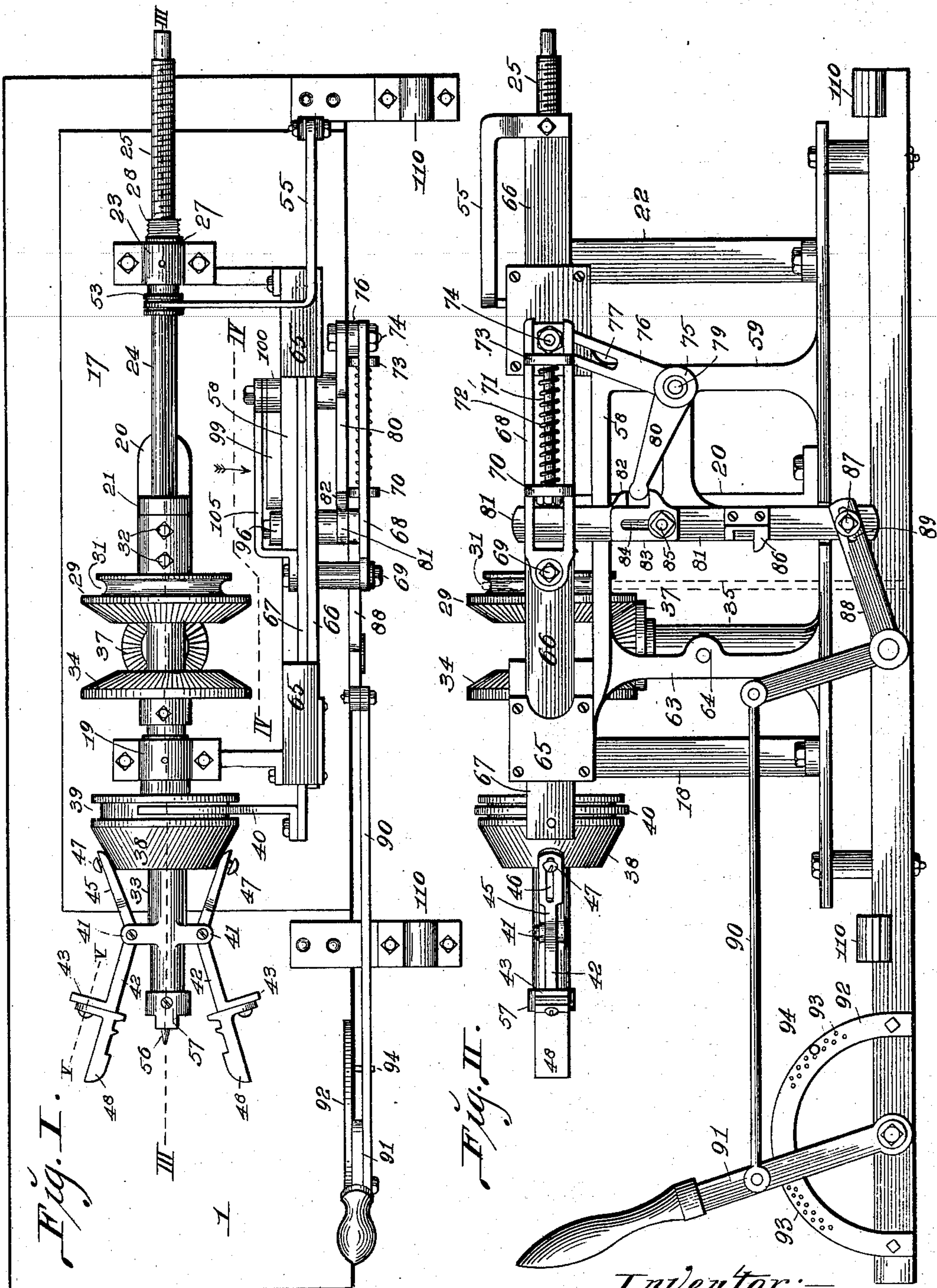
C. J. KONIG.

MACHINE FOR FINISHING NECKS OF BOTTLES.

(Application filed Mar. 23, 1900.)

(No Model.)

6 Sheets—Sheet 1.



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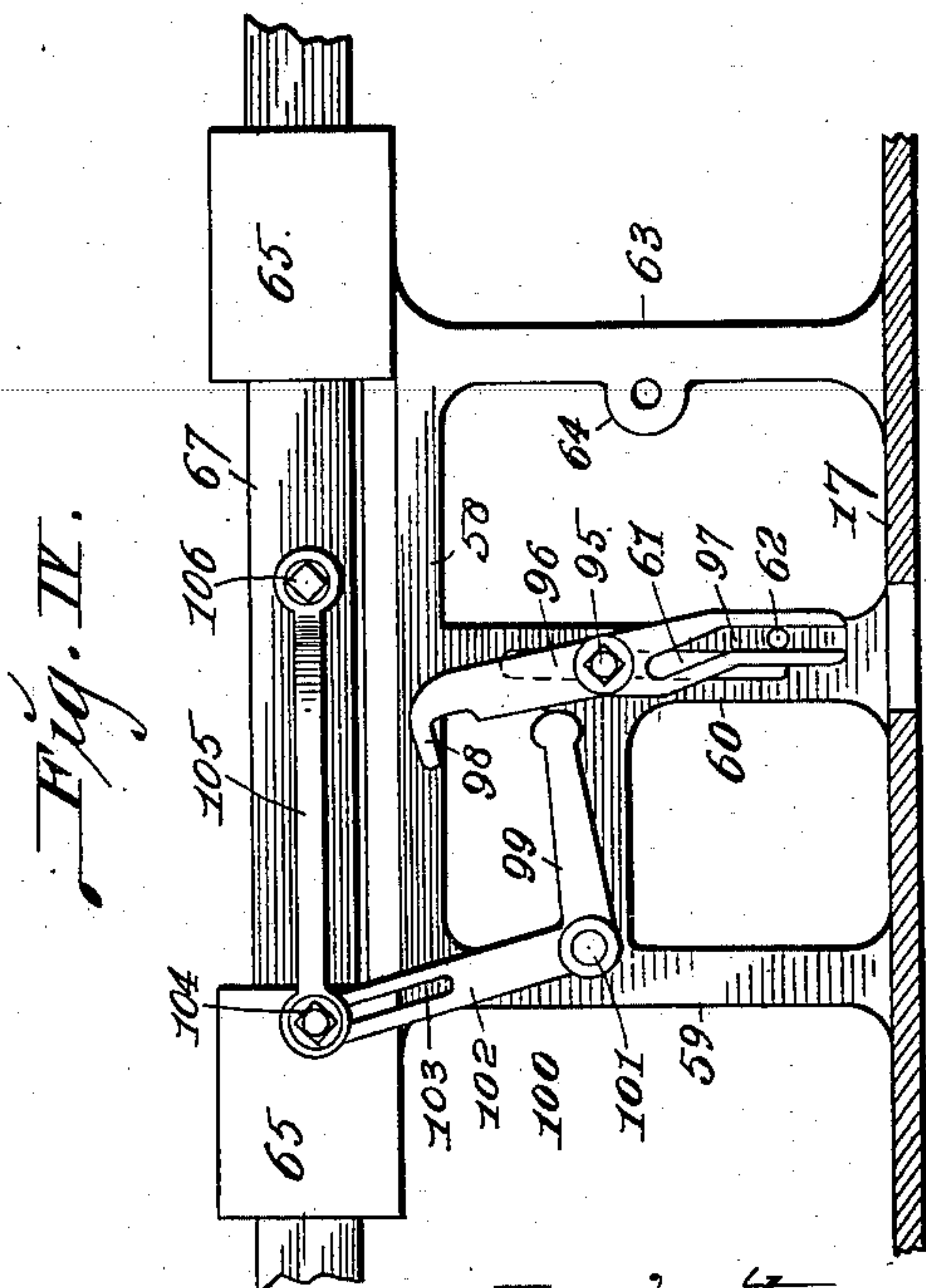
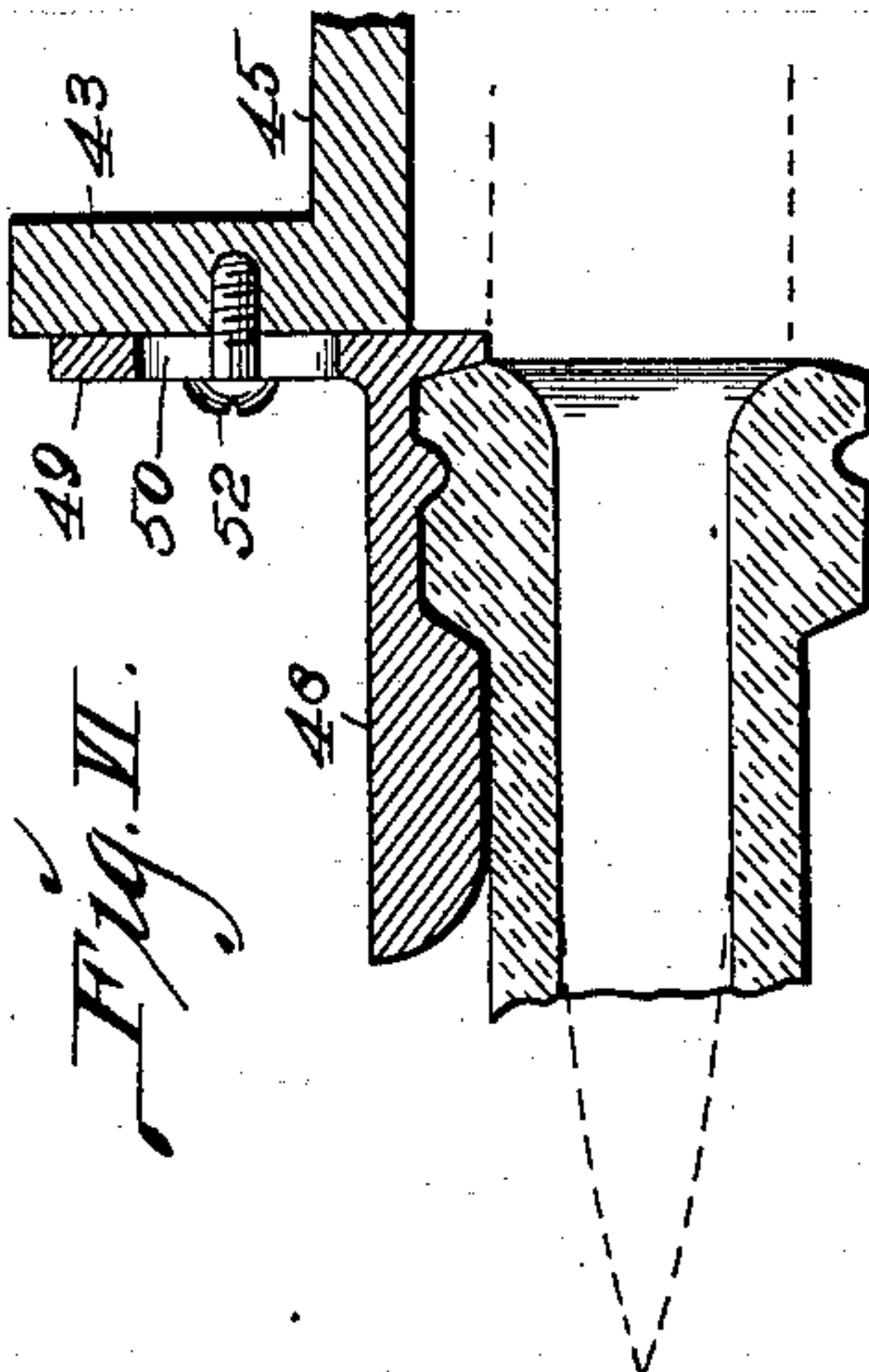
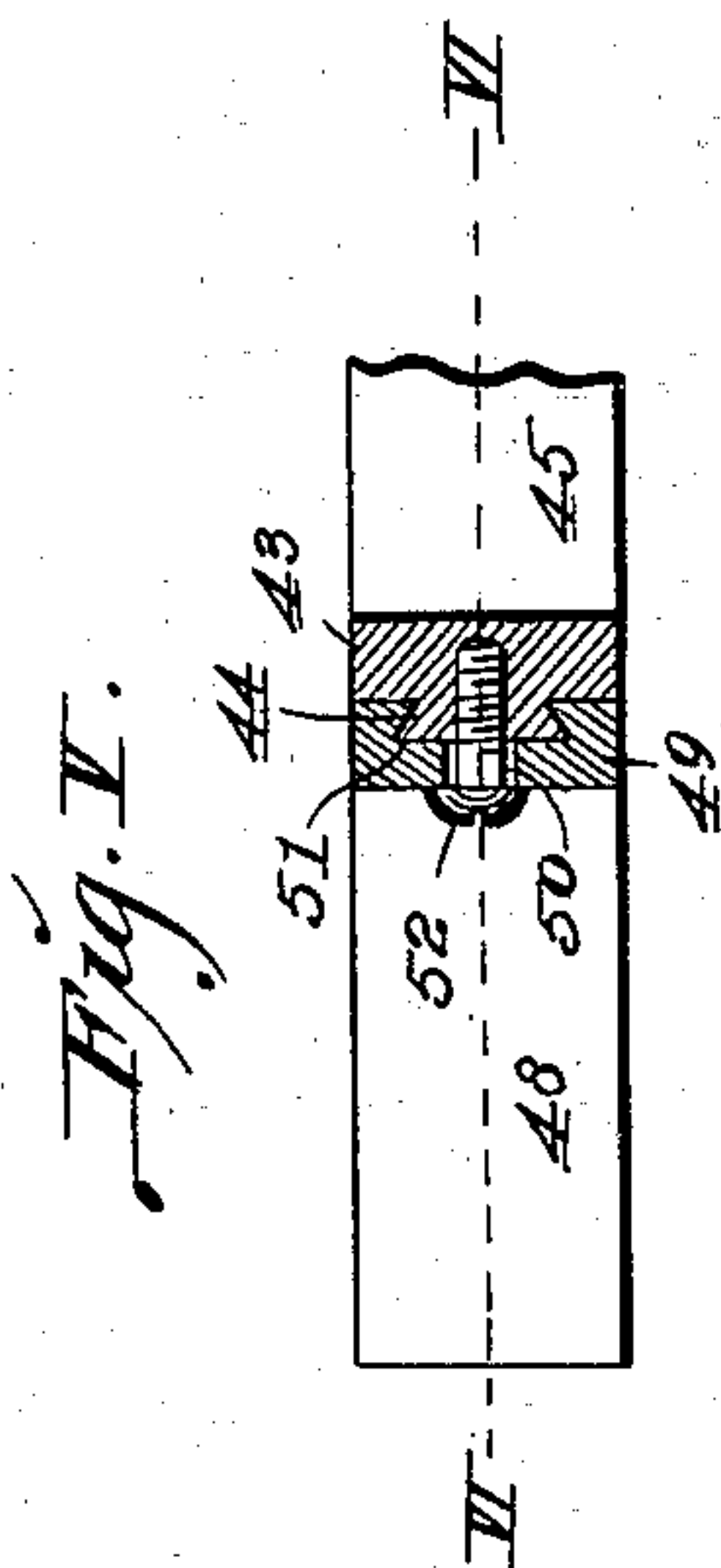
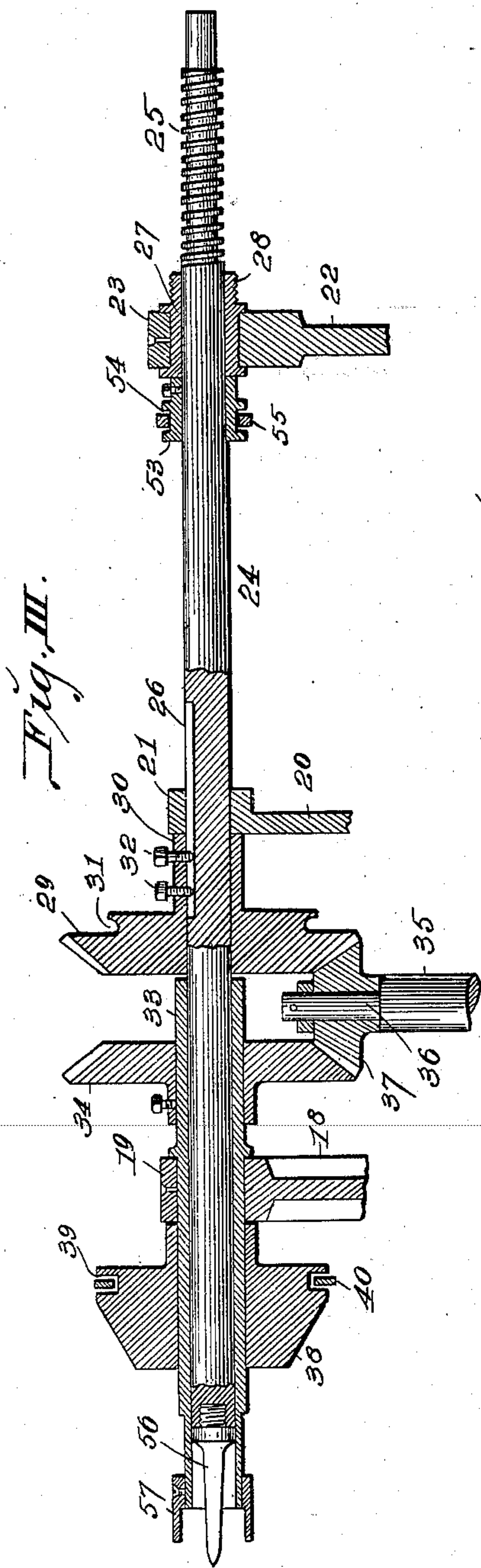
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Fig. VII.

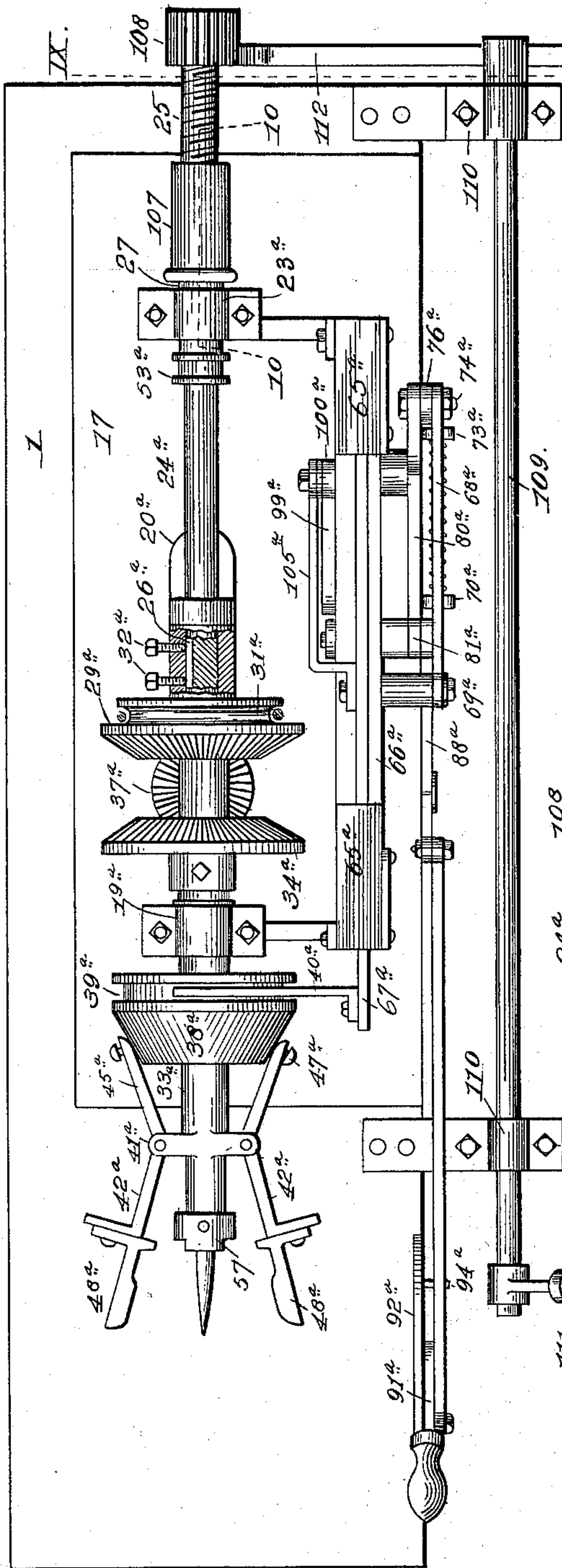


Fig. IX.

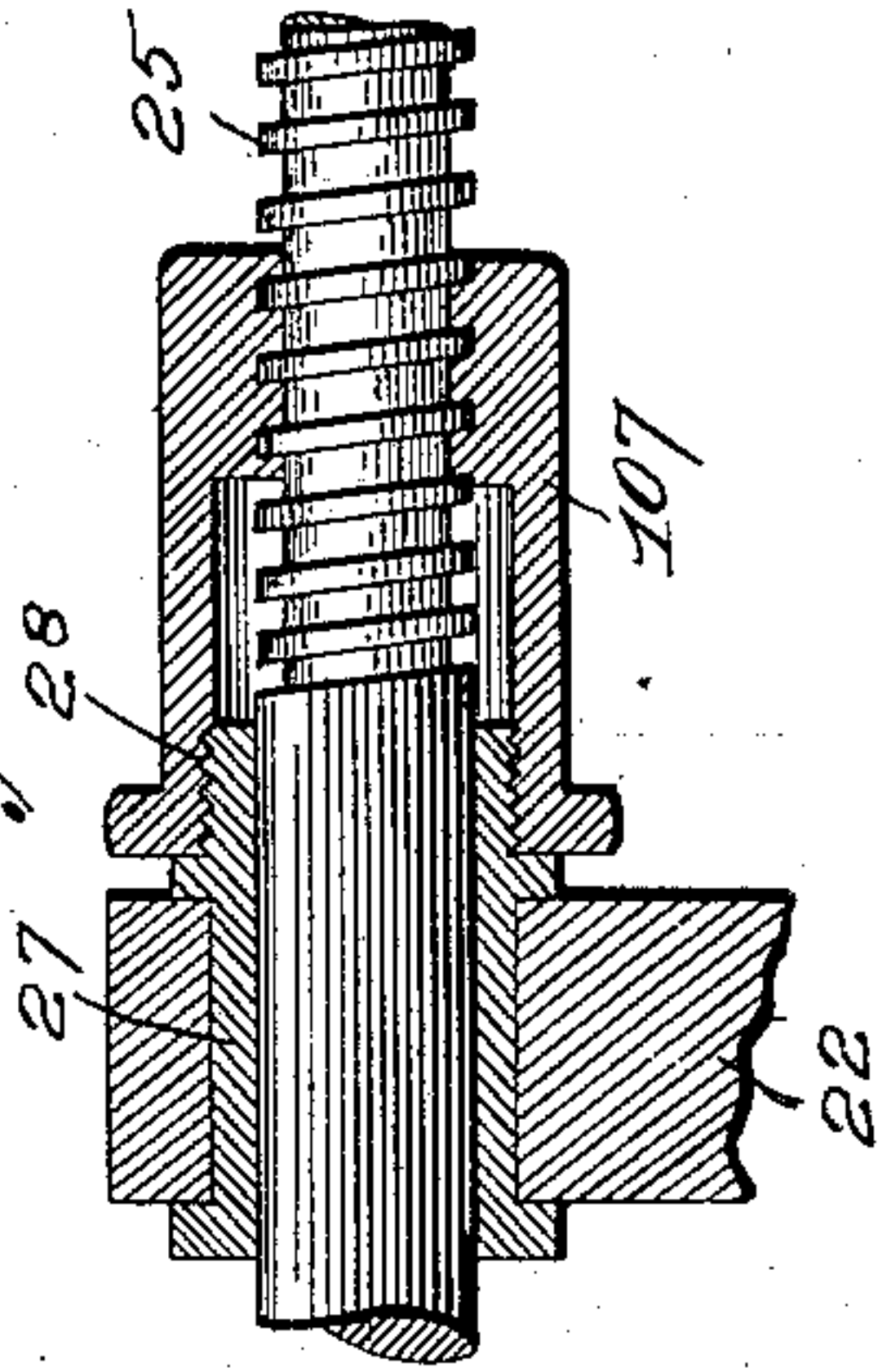


Fig. IX.

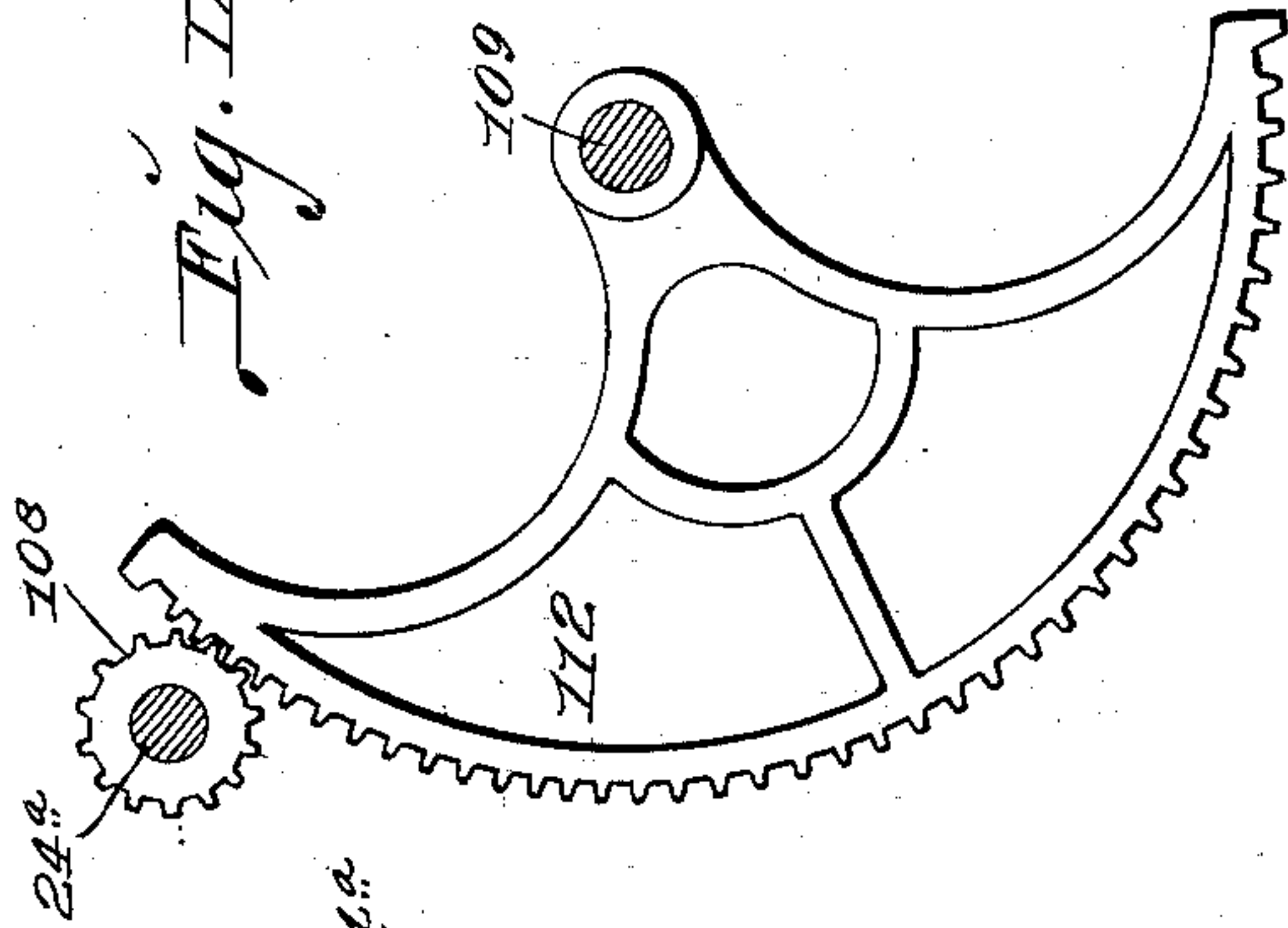
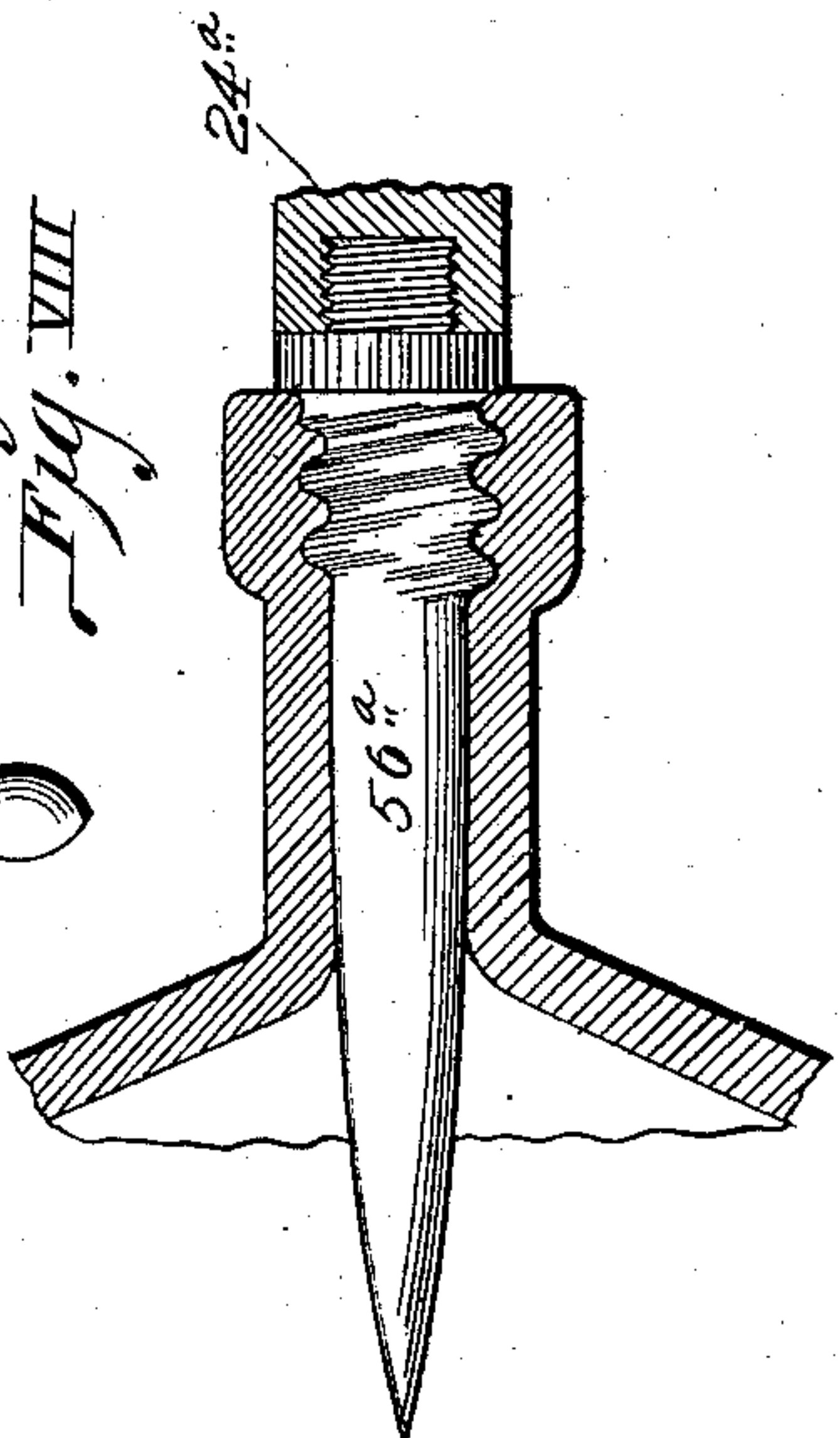


Fig. VIII.



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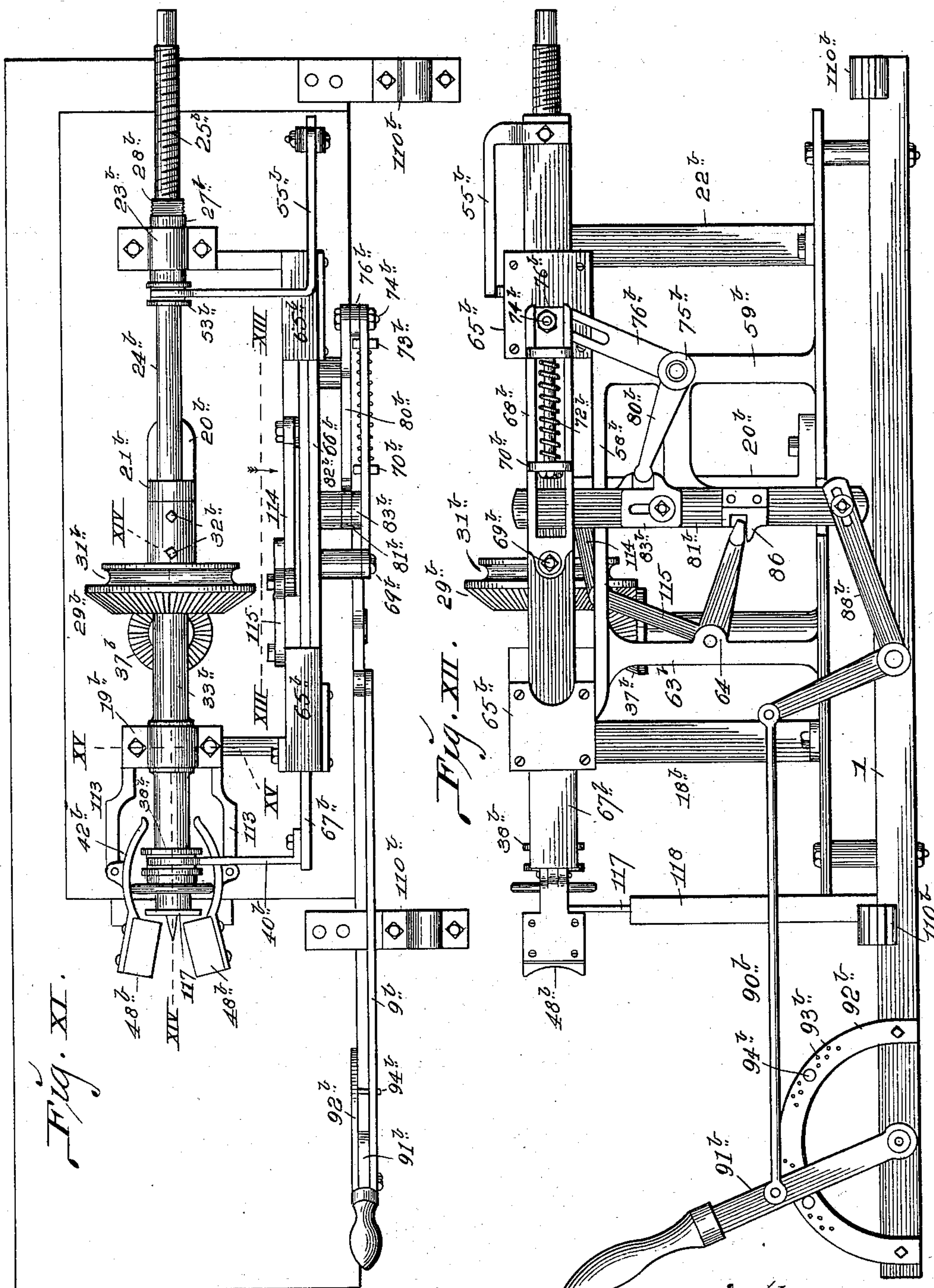
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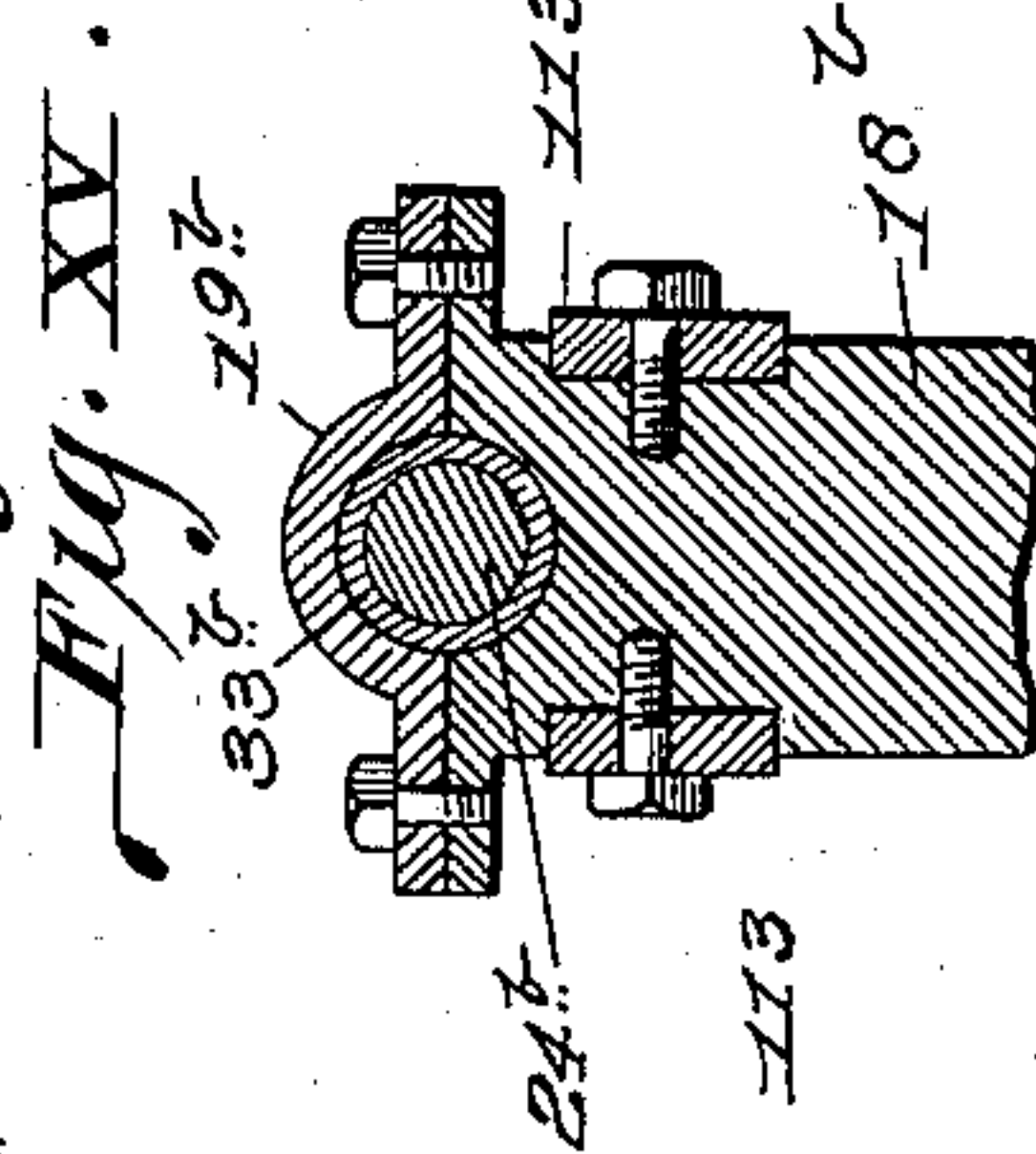
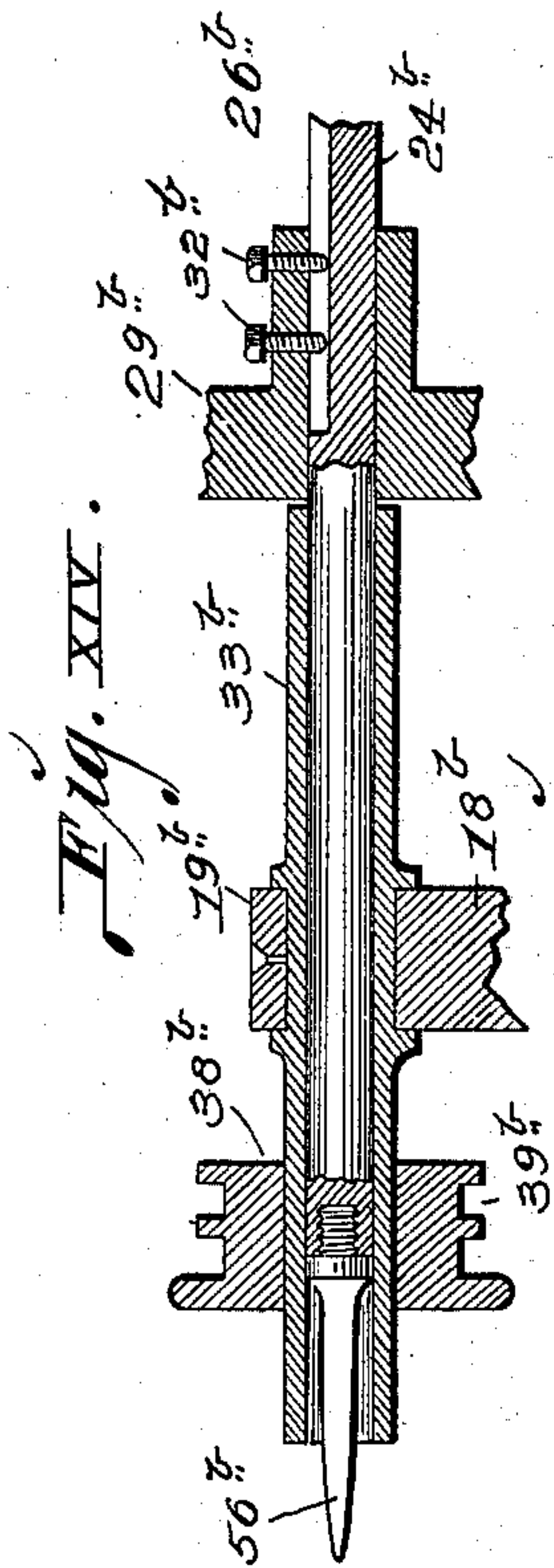
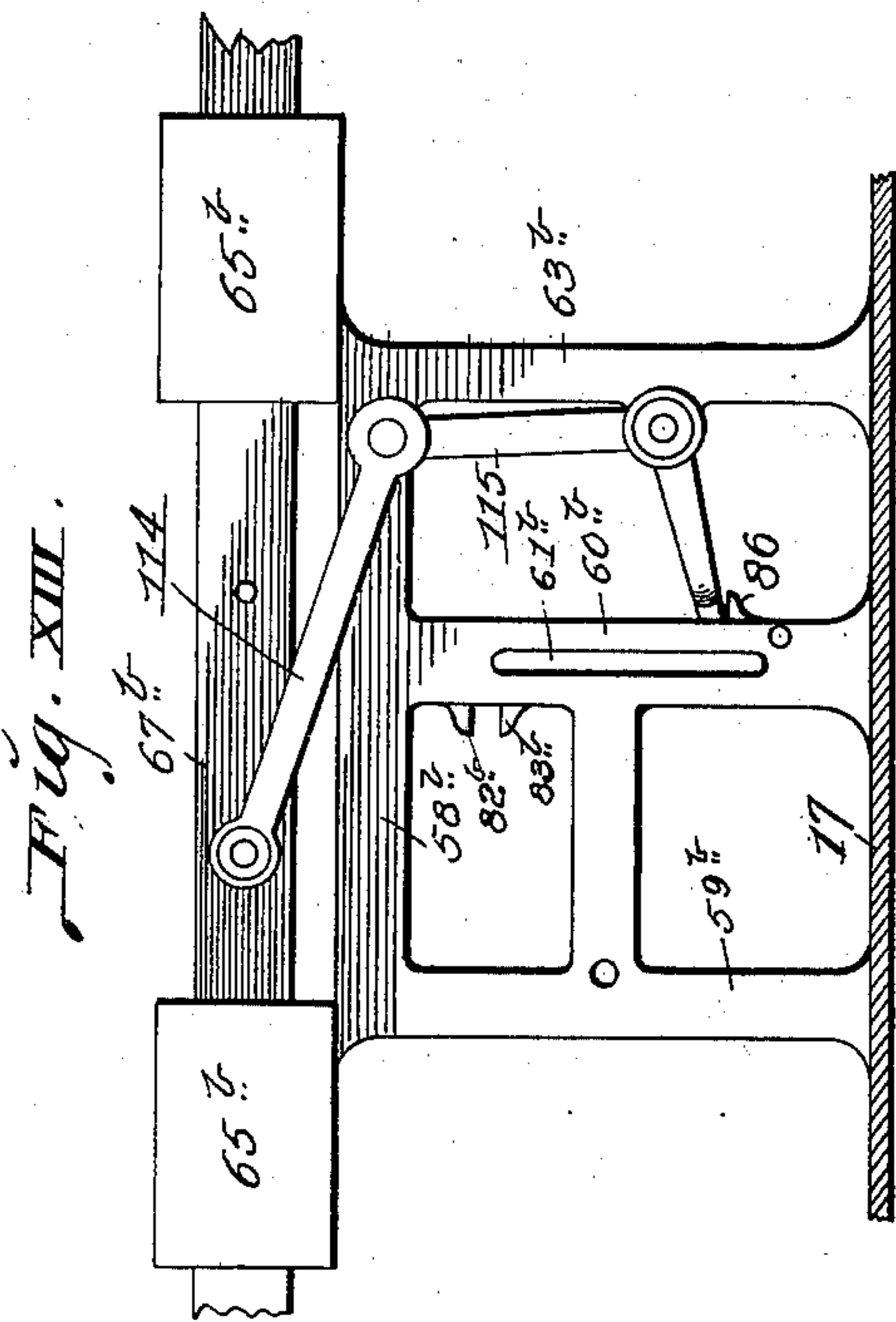
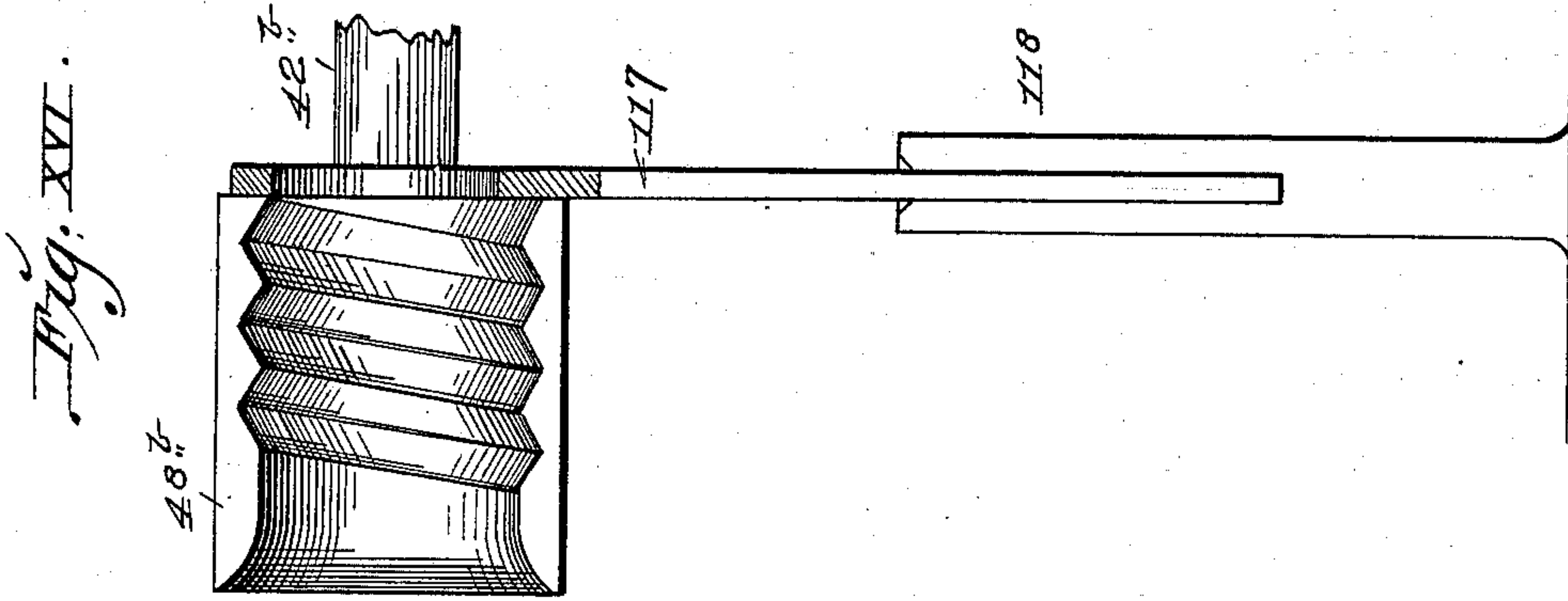
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6 Sheets—Sheet 5.



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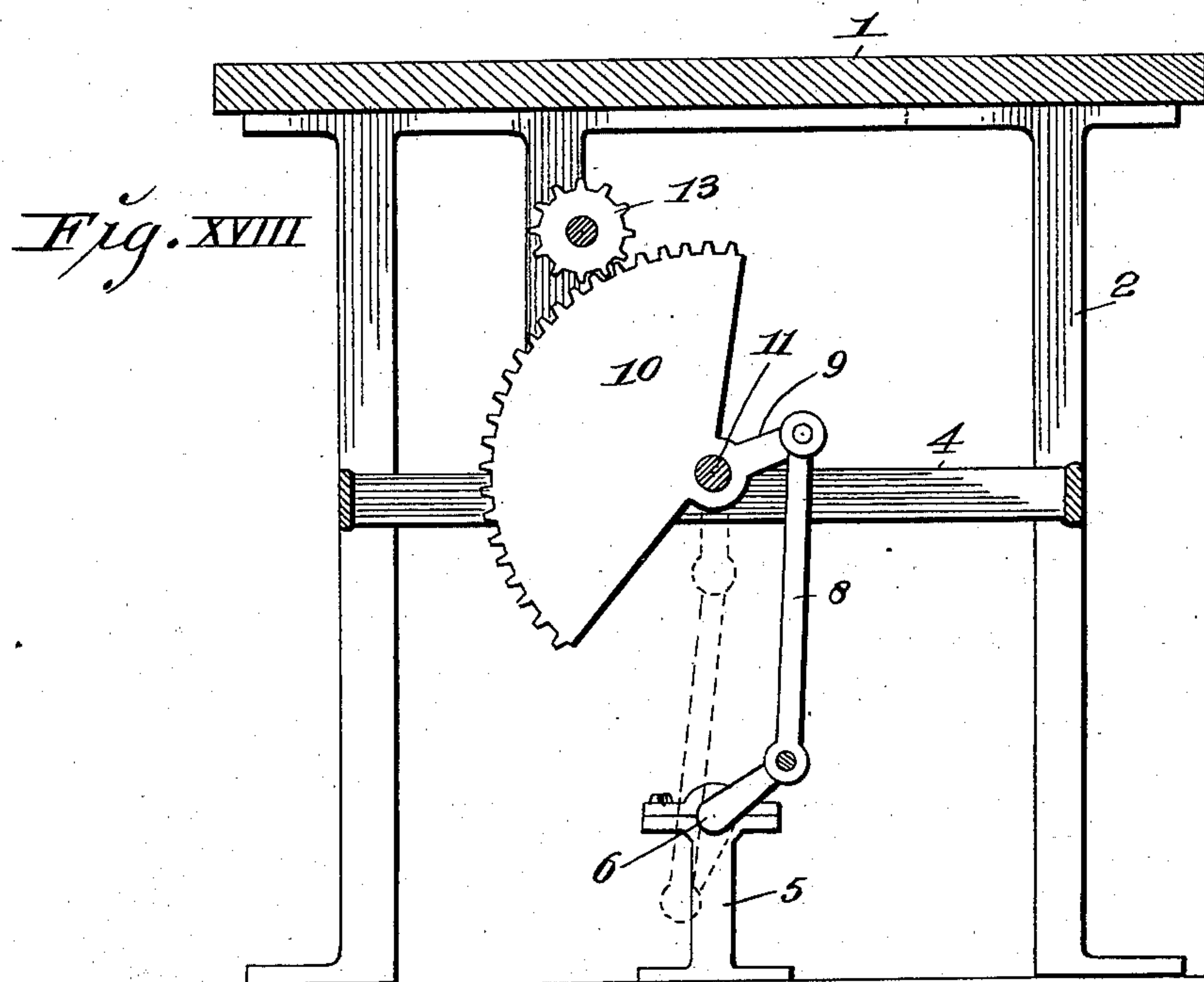
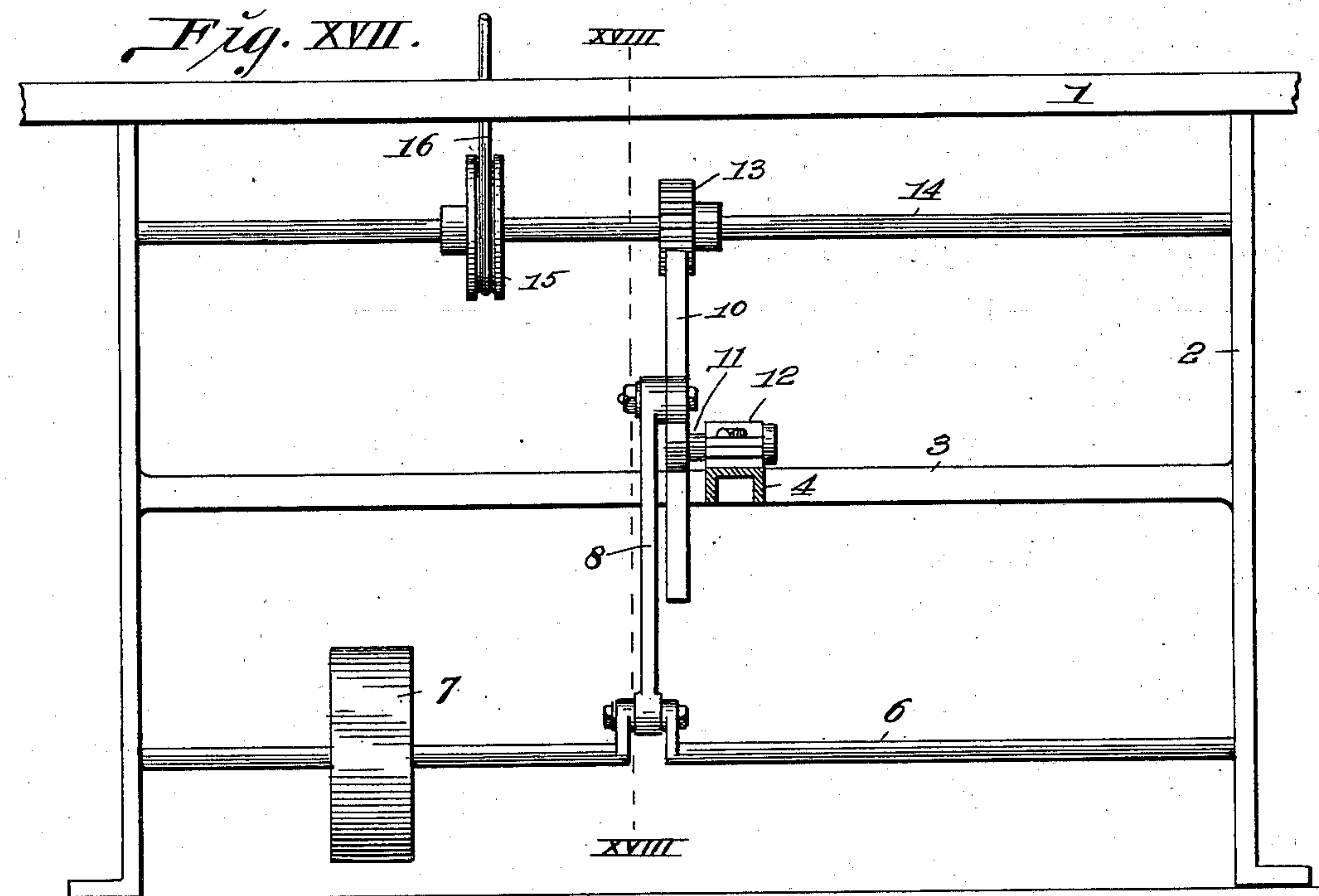
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(No Model.)

6 Sheets—Sheet 6.



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UNITED STATES PATENT OFFICE.

CHRISTIAN JULIUS KONIG, OF ALTON, ILLINOIS.

MACHINE FOR FINISHING NECKS OF BOTTLES.

SPECIFICATION forming part of Letters Patent No. 654,737, dated July 31, 1900.

Application filed March 23, 1900. Serial No. 9,904. (No model.)

To all whom it may concern:

Be it known that I, CHRISTIAN JULIUS KONIG, a citizen of the United States, residing at Alton, in the county of Madison and State of Illinois, have invented certain new and useful Improvements in Machines for Finishing the Necks of Bottles, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

My invention relates to a machine for forming the necks of bottles to produce the desired configuration thereof, both interiorly and exteriorly; and it consists in features of novelty hereinafter fully described, and pointed out in the claims.

Figure I is a top or plan view of the machine. Fig. II is a front elevation. Fig. III is an enlarged longitudinal vertical sectional view taken on the line III III, Fig. I. Fig. IV is an enlarged rear side elevation of a part of the rear actuating-slide, the slide-frame, and the rear-slide-actuating device, the supplemental table of the machine being shown in vertical section taken on the line IV IV, Fig. I. Fig. V is an enlarged detail view of one of the forming-dies, partly in section, taken on the line V V, Fig. I. Fig. VI is a longitudinal sectional view taken on the line VI VI, Fig. V, through the forming-die, showing a bottle-neck in position against the die. Fig. VII is a top or plan view showing the machine with variations employed in forming a screw-thread on the interior of the bottle-neck. Fig. VIII is an enlarged view of the thread-forming tool, showing it in position within the bottle-neck. Fig. IX is a detail view of the rocking gearing by which the tool-shaft is moved, a cross-section being taken on the line IX IX, Fig. VII. Fig. X is an enlarged sectional view taken on the line X X, Fig. VII. Fig. XI is a top or plan view of the machine constructed with variations utilized in forming a thread upon the exterior of the bottle-neck. Fig. XII is a front elevation of the machine as shown in Fig. XI. Fig. XIII is an enlarged detail side elevation of a part of the rear slide, its actuating parts, and the frame by which said parts are carried, the supporting supplemental table being shown in vertical section taken on the line XIII XIII, Fig. XI. Fig. XIV is an enlarged longitudinal sectional

view taken on the line XIV XIV, Fig. XI. Fig. XV is an enlarged cross-sectional view taken on the line XV XV, Fig. XI. Fig. XVI is an enlarged detail view of one of the exterior thread-forming dies and coincident parts. Fig. XVII is a front elevation of the machine-frame and driving mechanism. Fig. XVIII is a vertical cross-sectional view taken on the line XVIII XVIII, Fig. XVII, showing the driving mechanism partly in elevation.

1 designates the table of the machine, supported upon the frame 2, (see Figs. XVII and XVIII,) said frame having a longitudinal cross-bar 3 and a transversely-extending cross-bar 4. Mounted in posts 5 is a crank-shaft 6, provided with a driving-pulley 7, to which a belt may be applied to impart rotation to the shaft. The crank-shaft receives the connection of one end of a link 8, pivotally connected at its opposite end to an arm 9 projecting from a toothed segment, 10 fixed to a stub-shaft 11, that is mounted in a journal-box 12 on the cross-bar 4. The teeth of the segment 10 engage the teeth of a pinion 13, fixed to a driven shaft 14, mounted in the frame 2.

15 is a grooved pulley rigidly mounted on the shaft 14 and adapted to receive a driving-belt 16, by which movement is imparted to the parts of the machine hereinafter to be referred to.

Surmounting the table 1 is a supplemental table 17, on which are mounted posts 18, 20, and 22, equipped at their upper ends with journal-bearings 19, 21, and 23. Mounted in the journal-bearings 19, 21, and 23 is a shaft 24, the rear end of which is equipped with a screw 25 and which intermediate of its ends contains a groove 26. (See Fig. III.) The shaft turns in the journal-bushing 27 in the journal-bearing 23, said bushing being provided with a screw-threaded neck 28, to which reference will hereinafter be made.

29 is a bevel-pinion loosely mounted on the shaft 24 and connected thereto by feathering-screws 32, seated in the hub-neck 30 of the pinion, that enter the groove 26 in the shaft and permit of the shaft moving longitudinally through the pinion, while at the same time holding the pinion from turning on the shaft. The pinion 29 contains a groove 31, adapted to receive the driving-belt 16 to communicate

power from the pulley 15 to the pinion, and consequently to the shaft 24.

33 designates a sleeve loosely fitted to the shaft 24 upon its forward part. This sleeve 5 is arranged to turn in the journal-bearing 19 on the post 18. Fixed to the sleeve 33 is a bevel-pinion 34.

Surmounting the supplemental table 17 is a post 35, having a spindle 36, that receives a 10 bevel-gear 37, adapted to turn thereon. The bevel-gear 37 is arranged to receive the engagement of the teeth of the bevel-pinions 29 and 34, whereby movement is imparted to said bevel-gear from the turning of the pinion 34, 15 and the pinion 34 turned in the reverse direction from the pinion 29 to revolve the sleeve 33 contrary to the shaft 24. The shaft 24 and the sleeve 33 are not intended to rotate continuously, but are turned alternately 20 first in one direction and then in the other direction, each part moving two revolutions in one direction and then being reversed and moving two in the other direction. This alternating movement is accomplished by the 25 toothed segment 10 and pinion 13 and driving parts connected therewith. The teeth of the segment 10 are in multiple by two of the teeth in the pinion 13, so that when said segment is rocked by the crank-shaft 6 it turns the 30 pinion 13 alternately forwardly and backwardly.

38 designates a collar loosely mounted on the sleeve 33 forward of the post 18, said collar being provided with a groove 39, adapted 35 to receive a yoke 40, to which reference will subsequently be made. Projecting from the sleeve 33 are ears 41, that receive the pivotal connection of levers 42, having rearwardly-extending arms 45, provided with slots 46, 40 (see Fig. II,) arranged to receive screws 47, that enter the collar 38 to connect the arms and collar. The forward ends of the levers 42 are formed with arms 43, that upon their front faces are provided with dovetail tongues 45 44. (See Fig. V.)

48 are forming-dies having arms 49, containing slots 50 and provided with grooves 51, that receive the tongues 44 of the lever-arms 43, whereby a dovetail joint is provided 50 between the levers 42 and forming-dies 48, so that the dies may be adjusted on said levers. The dies are held to the levers by screws 52 passing through the slots 50 and seated in the lever-arms 43. The inner working surfaces of the forming-dies are of any configuration 55 corresponding to that desired to be formed upon the exterior of the bottle-neck, the manner of contact between the dies and bottle-neck being illustrated in Fig. VI.

60 Fixed to the shaft 24 forward of the rear post 22 is a collar 53, provided with a groove 54, arranged to receive a yoke 55, these parts being designed for service in accomplishing longitudinal or endwise movement of the 65 shaft 24 in the manner to be hereinafter explained. The forward end of the shaft 24 is provided with a socket adapted to receive a

removable forming-tool 56, by which the interior of the bottle-neck is shaped, this tool being thrust forwardly into the bottle-neck 70 through the sleeve 33 when the bottle is placed against the end of the sleeve to be formed.

57 is a gage-collar secured to the forward end of the sleeve 33, adapted to receive the 75 bottle-neck to confine it while being shaped.

In the practical use of the machine it is necessary that the shaft 24 be projected forwardly to carry the tool 56 into the bottle-neck while the shaft is revolved, whereby the 80 interior of the neck is shaped. It is also necessary that the loose collar 38 be shifted on the sleeve 33 to cause the forming-dies 48 to be brought against the exterior of the bottle-neck, while the tool 56 is projected into 85 the interior of said neck. In order to accomplish the movement of the parts named in the manner stated, I employ means for shifting the shaft and collar that will now be described. 90

Located on the supplemental table 17 is a frame 58, having uprights 59, 60, and 63, and supported by the frame 58 are boxes 65. Slidably mounted in the boxes 65 are a front 95 slide 66 and a rear slide 67. The front slide 66 has connected to it the yoke 55, that engages the grooved collar 53, located on the shaft 24, and it is through movement of this slide that the shaft 24 receives longitudinal movement, as will appear. The forward end of the rear 100 slide 67 has connected to it a yoke 40, that engages in the grooved collar 38, mounted on the sleeve 33, and it is through the movement of this slide 67 that said collar 38 is shifted to move the die-carrying levers 42, as will appear. 105

68 is a guide-frame connected to the slide 66 by a bolt 69 (see Figs. I and II) and having an open rear end. The frame 68 is constructed with an eye portion 70, rigid there- 110 with, that receives a slide-bolt 71, surrounded by a spring 72. The rear end of the bolt 71 is connected to a slide 73, arranged to operate in the guide-frame 68. The slide 73 contains a bolt 74. 115

75 designates a bell-crank the arm 76 of which is provided with a slot 77, adapted to receive the bolt 74, so that said bolt may play therein. The bell-crank 75 is mounted on a trunnion 79, projecting from the upright 59 120 of the frame 58, and has a forwardly-projecting arm 80.

81 designates a reciprocating bar vertically arranged in front of the frame 58. In the lower end of the oscillatory bar 81 is a pivot- 125 bolt 87, that receives the connection of one arm of a bell-crank 88, pivoted to the table of the machine, the bolt 87 being received by a slot 89 in the bell-crank arm. The opposite end of the bell-crank 88 has pivoted to it 130 one end of the connecting-rod 90, the opposite end of said rod being joined to a hand-lever 91, pivoted to the machine-table. Fixed to the machine-table, beside the hand-lever, is

a sector 92, containing apertures 93, adapted to receive a pin 94, by which the throw of the hand-lever may be limited to control the consequent movement of the bar 81, that is moved when the lever is rocked. The bar 81 is provided at the edge facing the bell-crank arm 80 with a lug 82, and lying against the side of the bar 81 is an adjustable stop 83, provided with a slot 84, that receives a bolt 85, inserted through the bar. The space between the lug 82 and a lip projecting from the stop 83 receives the end of the bell-crank arm 80, so that movement imparted to the reciprocating bar is communicated to the bell-crank 75. When it is desired to project the shaft 24 forwardly to carry the tool 56 into the neck of the bottle to be shaped, the hand-lever 91 is moved inwardly, and the reciprocating bar 81 is thereby caused to move downwardly, throwing the arm 80 of the bell-crank 75 downwardly and the arm 76 forwardly. In such action the spring 72 serves as a buffer to prevent jar in the initial movement of the slide 66, and as the parts are moved, as described, the guide-frame is carried forwardly, moving therewith the slide 66 and yoke 55. The yoke having engagement with the collar 53 on the shaft 24 causes said shaft to be thrust forwardly to project the tool 56 through the forward end of the sleeve 33, the shaft at the same time being turned through the revolving of the bevel-pinion 29.

I next come to the description of the parts by which the die-carrying levers 42 are moved, these levers being actuated just subsequently to the forward projection of the tool 56.

95 designates a bolt passing through the vertical slot 61 in the upright 60 of the frame 58, (see Fig. IV,) and seated in the reciprocating bar 81, so that the movement of said bar causes the movement of the bolt 95 in the slot 61. Pivotaly mounted on the bolt 95 is a dog 96, having in its lower end a cam-slot 97, arranged to play on the stub 62, projecting from the upright 60, so that the dog may be rocked as it is lowered. The upper end of the dog is provided with a hook 98, that as the dog is moved downwardly by the bar 81 is brought into engagement with the arm 99 of a bell-crank 100, pivoted to a stub-shaft 101, projecting from the frame-upright 58. The arm 102 of the bell-crank 100 contains a slot 103, that receives a bolt 104 in one end of a link 105, the opposite end of said link being connected at 106 to the rear slide 67. As the bar 81 is moved downwardly in the manner before explained the dog 96 is moved therewith and the hook 98 comes in contact with the bell-crank arm 99, causing the bell-crank to be rocked to impart movement to the link 105 and project the slide 67 forwardly, thereby moving the yoke 40, and consequently the grooved collar 38 on the sleeve 33. As the collar 38 is moved the rear arms 45 of the levers 42 are spread and the forming-dies 48 are caused to approach each other and brought

against the bottle-neck located on the tool 56 to shape the exterior of said neck, the dies at the same time revolving in an opposite direction to that in which the shaft 24 and tool 56 are turned, as explained.

I will next describe the machine as used in producing a screw-thread on the interior of the bottle-neck in addition to otherwise forming the interior and forming the exterior. The machine as used in such instance is illustrated in Figs. VII to X, inclusive. The forming-dies 48^a, that operate upon the exterior of the bottle-neck, are actuated similarly to the dies 48, hereinbefore described; but the bevel-pinion 29^a is loose upon the shaft 24^a, the feathering-screws 32^a being withdrawn from the groove 26^a in said shaft. By this arrangement the pinion 29^a turns loosely upon the shaft 24^a to communicate movement through the bevel-gear 37^a to the bevel-pinion 34^a to drive the sleeve 33^a. The shaft 24^a carries at its forward end the thread-forming tool 56^a, adapted for service in producing a screw-thread on the interior of the neck of the bottles to be operated upon. In the use of the tool 56^a it is necessary that the shaft 24^a have imparted to it a positive forward thrust and simultaneous rotation. To obtain these movements, I apply to the screw 25 at the rear end of the shaft a sleeve 107, having an interior screw-thread corresponding to the screw 25. This sleeve is connected to the screw-threaded neck 28 of the journal-bushing 27. Fixed to the end of the shaft 24^a beyond the screw 25 is a pinion 108.

109 designates a rocking shaft mounted in bearings 110 and provided with a handle 111. Carried by this rocking shaft is a toothed segment 112, the teeth of which are adapted to mesh with the teeth of the pinion 108. Upon rocking the shaft 109 the operator rotates the pinion 108, and thereby turns the shaft 24^a and screw 25. The screw 25 turns in the sleeve 107, causing the shaft to be thrust forwardly as it is turned, and by this means the screw-forming tool 56^a receives the required forward movement and rotation to produce the screw-thread upon the interior of the bottle-neck.

In the use of the machine to produce screw-threads upon the exterior of bottle-necks I alter and arrange the parts into the form shown in Figs. XI to XVI, inclusive. The shaft 24^b is equipped with the forming-tool 56^b, similar to that shown in Figs. I to VI, inclusive, and the bevel-pinion 29^b is mounted on the shaft 24^b and prevented from turning thereon by the feathering-screws 32^b, that enter into the groove 26^b in the shaft. The bevel-pinion 34 is omitted. The forward thrust of the shaft 24^b is accomplished by the actuation of the yoke 55^b in a similar manner to that described in connection with the shifting of said shaft as shown in Figs. I to VI, and the parts by which said yoke 55^b is actuated are indicated upon the drawings by

similar numerals, with the affix letter "b" to those designating the same parts in Figs. I to VI.

48^b designates the forming-dies for the exterior of the bottle-neck, containing thread-grooves adapted to make their impression upon the bottle-neck to produce threads thereon. As the bottle-neck is merely compressed between these dies there is no necessity of the sleeve 33^b being rotated. Hence the omission of the bevel-pinion 34. The forming-dies 48^b are carried by curved levers 42^b, that are pivoted to arms 113, secured to the post 18^b. Loosely mounted on the forward end of the sleeve 33^b is a sliding collar 38^b, provided with a groove 39^b, the groove being adapted to receive the yoke 40^b, carried by the slide 67^b. The dies 48^b are moved toward each other upon the rearward movement of the sliding collar 38^b, riding between the levers 42^b, and the slide 67^b is likewise moved rearwardly instead of forwardly in closing the dies. The connection between the said slide and the reciprocating bar 81^b to cause such movement is by a link 114, connected at one end to the slide 67^b, and having its opposite end connected to one arm of a bell-crank 115. The other arm plays in a socket 86, carried by the reciprocating bar 81^b. On referring to Fig. XII it will be seen that the bell-crank 75^b is located upon one side of said reciprocating bar and the bell-crank 115 on the opposite side and that therefore in the movement of the reciprocating bar said bell-cranks are moved at the same time, but contrary to each other, with the result that the slide 66^b is moved forwardly to shift the shaft 24^b and the slide 67^b is moved rearwardly to shift the collar 38^b rearwardly and close the dies each time that the bottle-neck is shaped.

117 (see Figs. XII and XVI) is a gage-bar supported in a post 118, said bar being located in the rear of the dies 48^b, and adapted to form a stop for the bottle-necks when inserted between the dies.

I claim as my invention—

1. In a machine of the class described, the combination of a shaft, means for rotating said shaft, means for shifting the shaft longitudinally, a forming-tool carried by said shaft, a sleeve surrounding the shaft at its forward end, means for rotating said sleeve, independently of said shaft, levers pivoted to said sleeve, forming-dies carried by said levers, and means whereby said levers are rocked, substantially as described.

2. In a machine of the class described, the combination of a shaft, means for rotating said shaft, means for shifting said shaft longitudinally, a forming-tool carried by said shaft,

a sleeve surrounding said shaft, means for rotating said sleeve independently of said shaft, a pair of forming-dies, levers by which said dies are carried pivoted to said sleeve, a collar slidably mounted on said sleeve arranged to move said levers, and means for shifting said collar, substantially as described.

3. In a machine of the class described, the combination of a revoluble shaft, a forming-tool carried thereby, means for rotating said shaft, a sleeve surrounding the forward end of said shaft, means for rotating said sleeve independently of said shaft, a pair of levers pivoted to said sleeve, dies carried by said levers, means for rocking said levers to move said dies, and means for shifting said shaft longitudinally, substantially as described.

4. In a machine of the class described, the combination of a shaft, a forming-tool carried thereby, means for rotating said shaft, a sleeve surrounding the forward end of said shaft, means for rotating said sleeve independently of said shaft, levers pivoted to said sleeve, dies carried by said levers, means for rocking said levers, a slide having connection to said lever-rocking means, a slide having connection to said shaft, a reciprocating bar, means of connection between said slides and said bar, and means for actuating said bar, substantially as described.

5. In a machine of the class described, the combination of a shaft, means for rotating said shaft, a sleeve loosely surrounding the forward ends of said shaft, means for rotating said sleeve, dies carried by said sleeve, means for moving said dies, a slide having connection with said die-moving means, a slide having connection with said shaft, bell-cranks having connection to said slides, a reciprocating bar having engagement with said bell-cranks, and means for actuating said bar, substantially as described.

6. In a machine of the class described, the combination of a shaft, means for rotating said shaft, a slide, a yoke carried by said slide arranged for engagement with said shaft, a pair of dies, means for moving said dies, a second slide having connection to said die-moving means, a bell-crank having engagement with said first-named slide, a bell-crank having engagement with said second slide, a reciprocating bar arranged to engage said first-named bell-crank, and a dog carried by said bar arranged to engage said second bell-crank, substantially as described.

CHRISTIAN JULIUS KONIG.

In presence of—

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