

No. 680,484.

Patented Aug. 13, 1901.

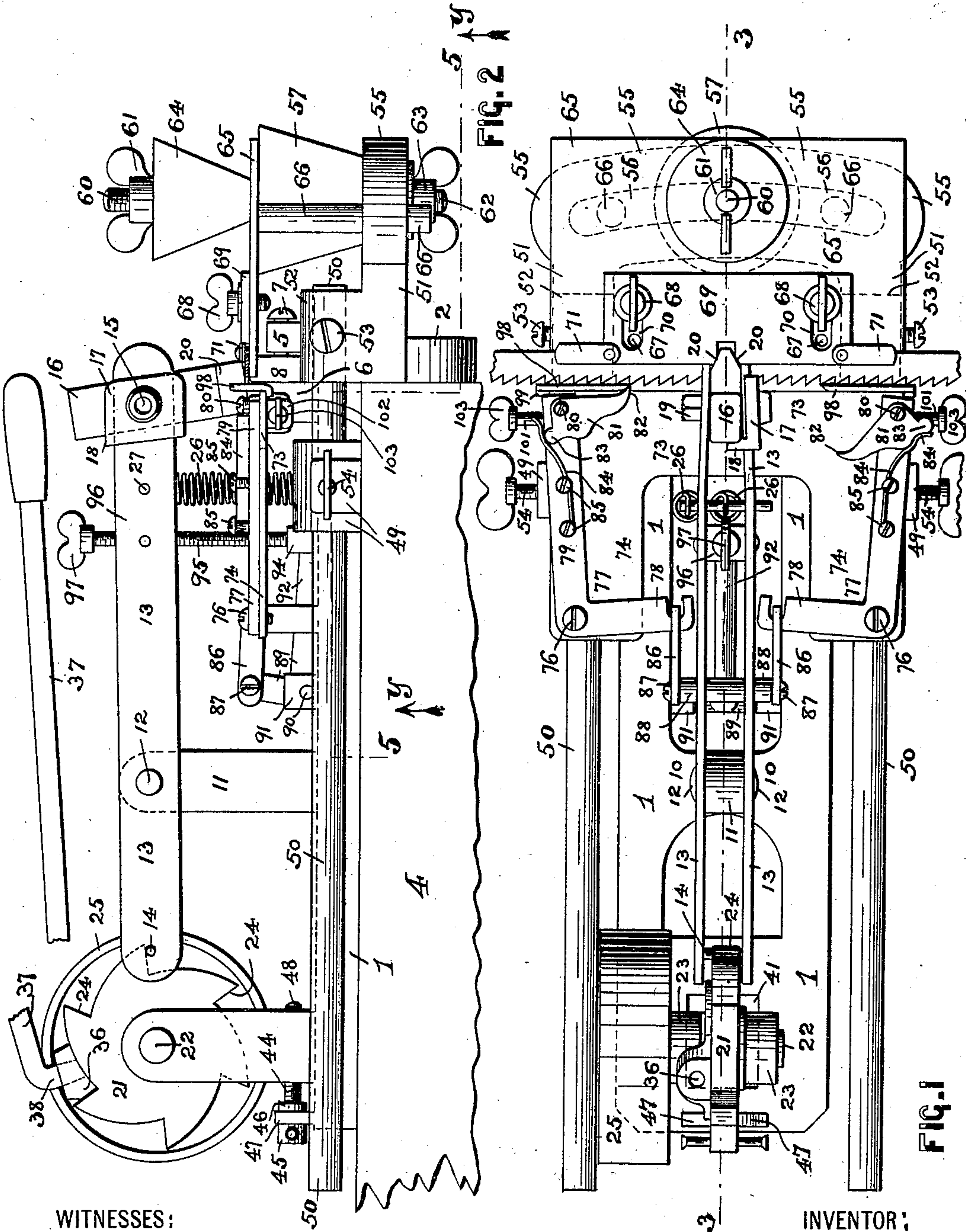
J. GOTTMANN.

APPARATUS FOR SETTING SAW TEETH.

(Application filed Mar. 14, 1901.)

(No Model.)

3 Sheets—Sheet 1.



WITNESSES:

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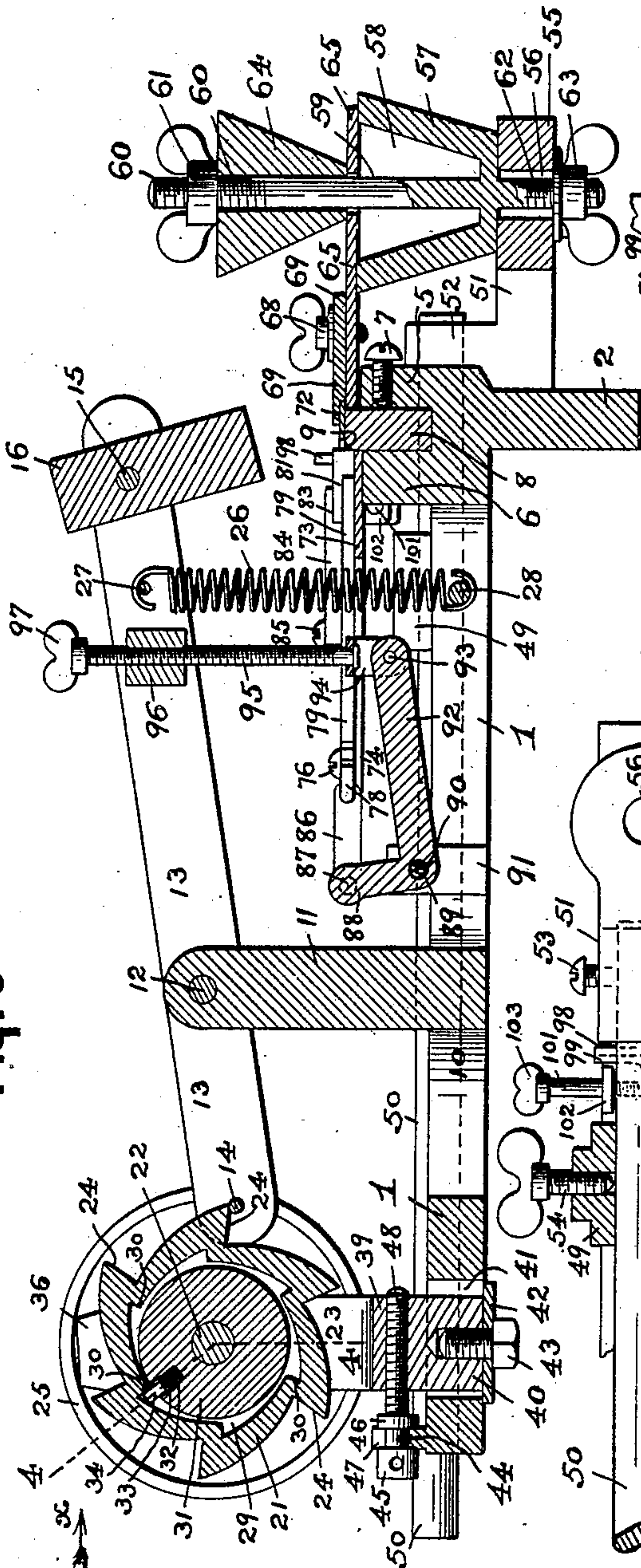
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FIG. 3



WITNESSES:

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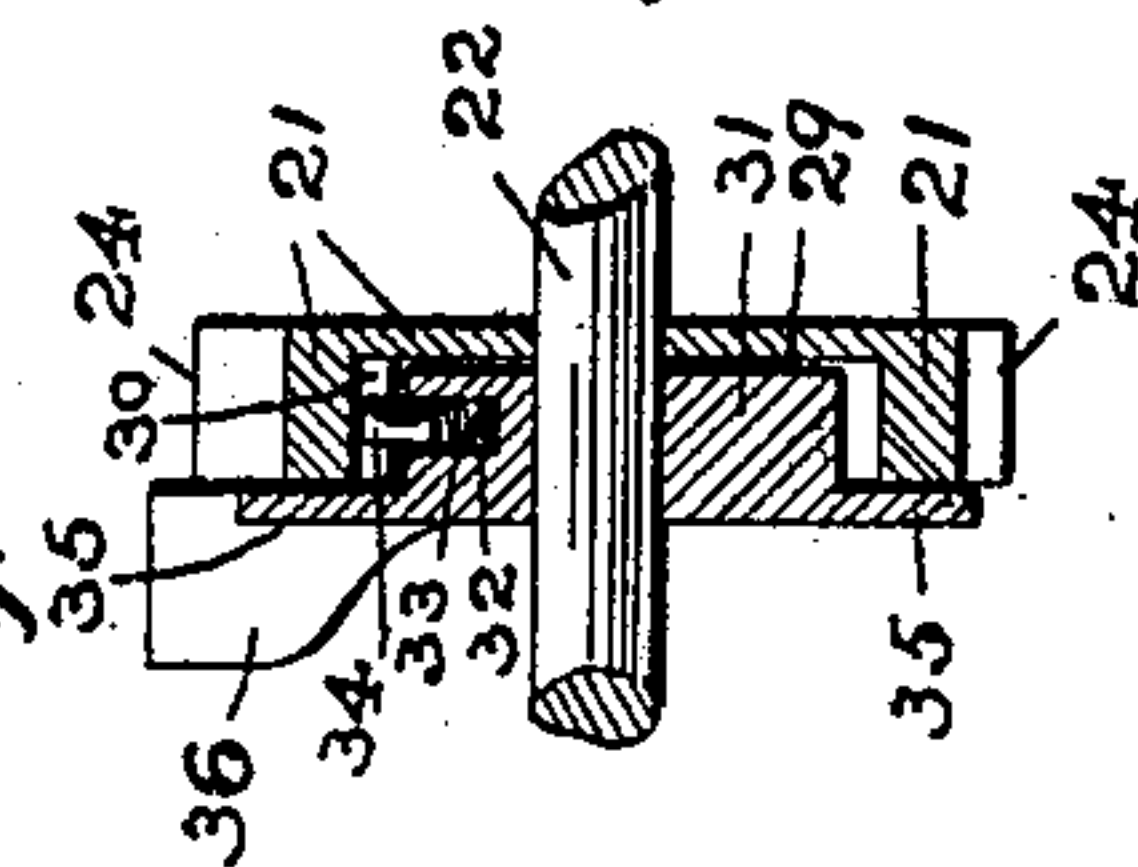


FIG. 4

FIG. 5

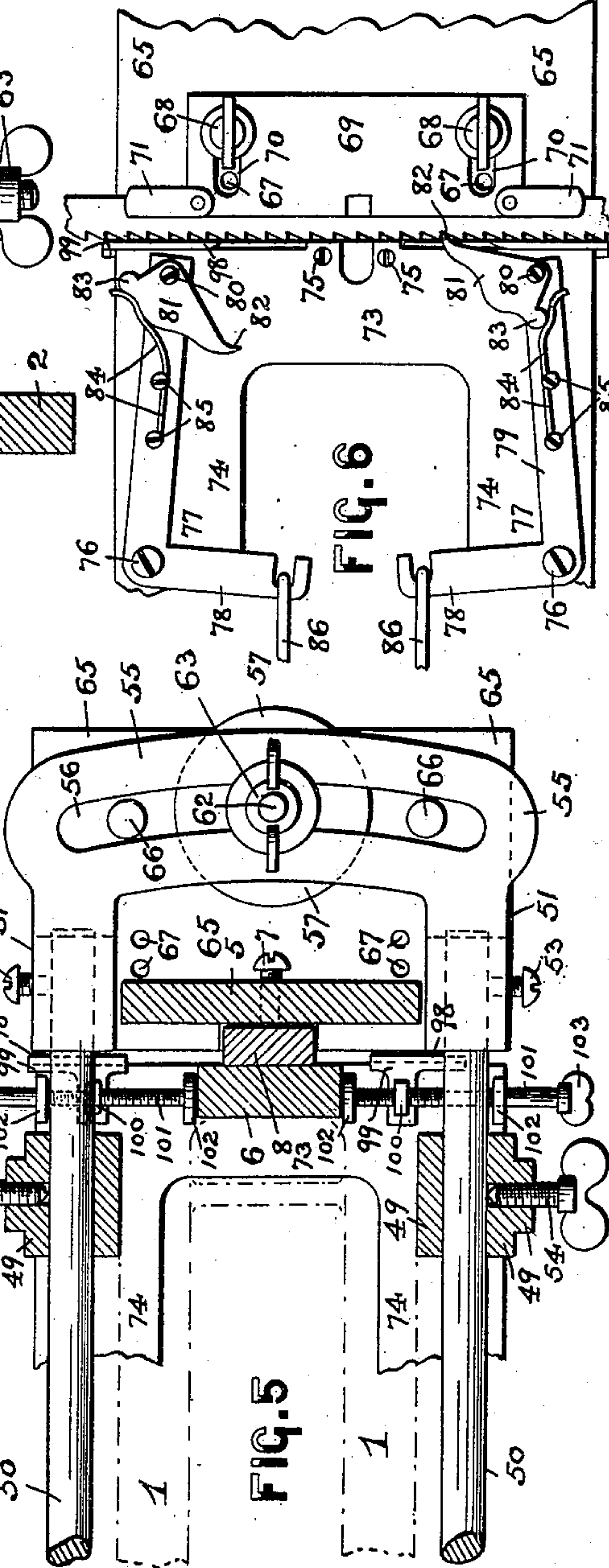


FIG. 6

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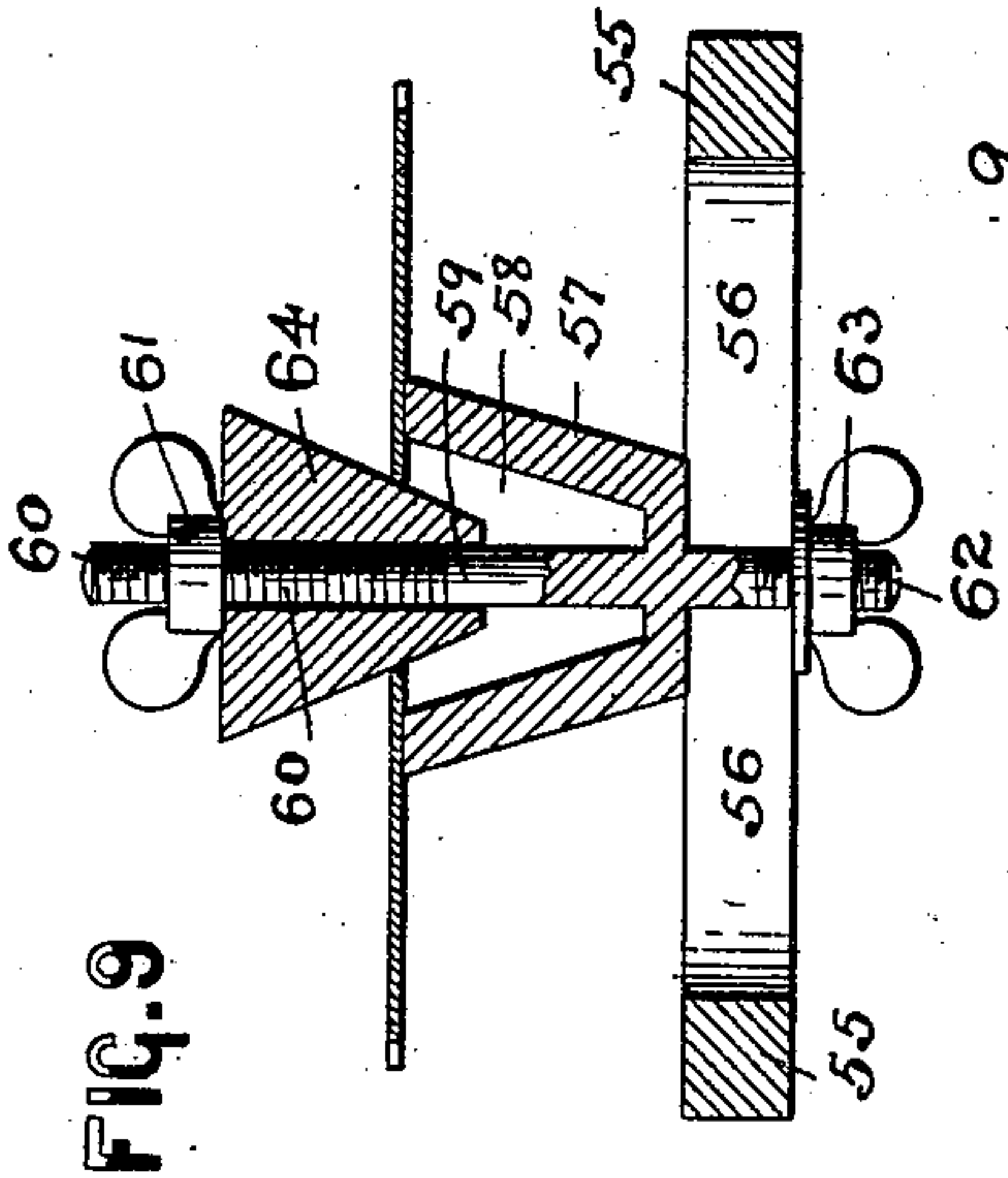
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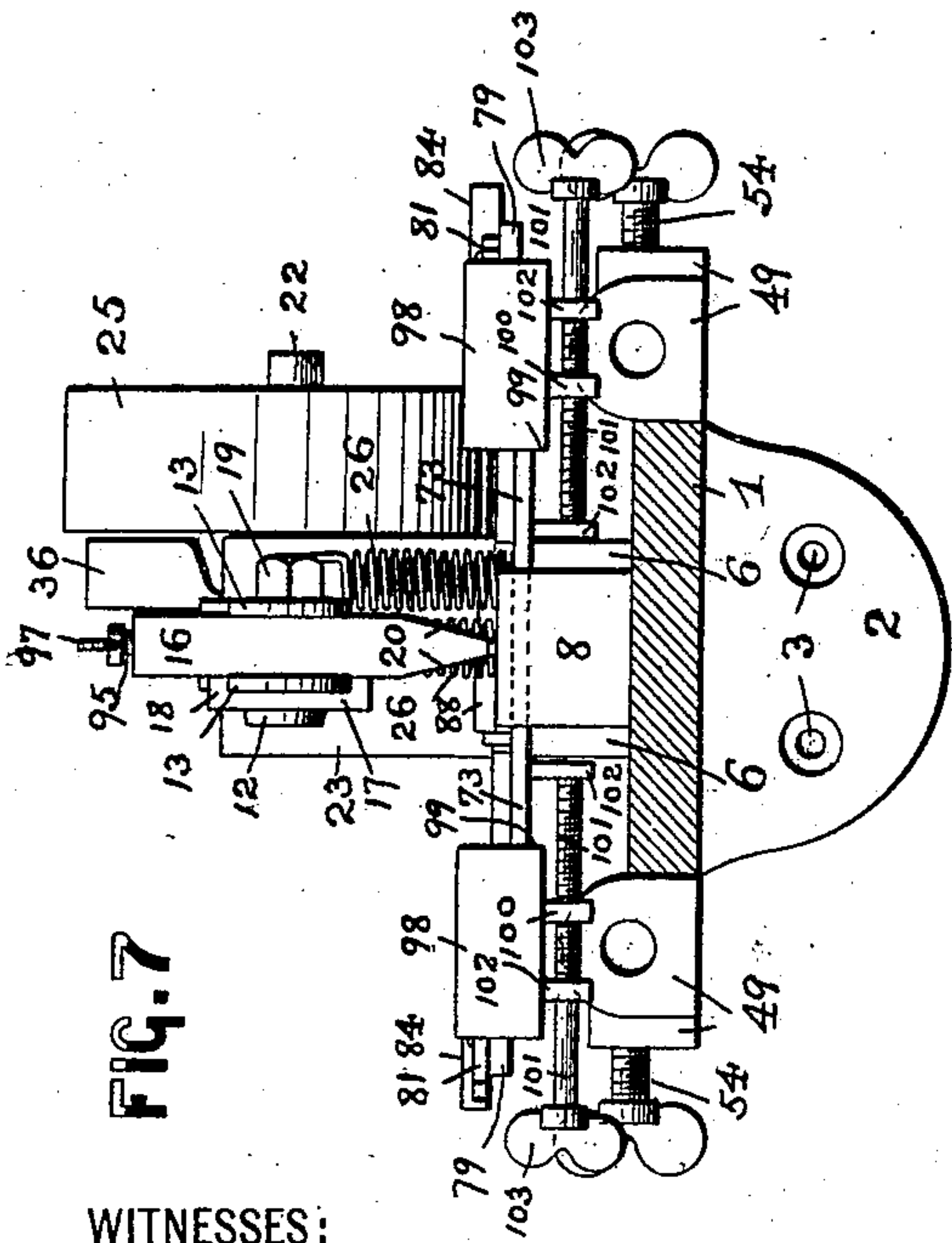
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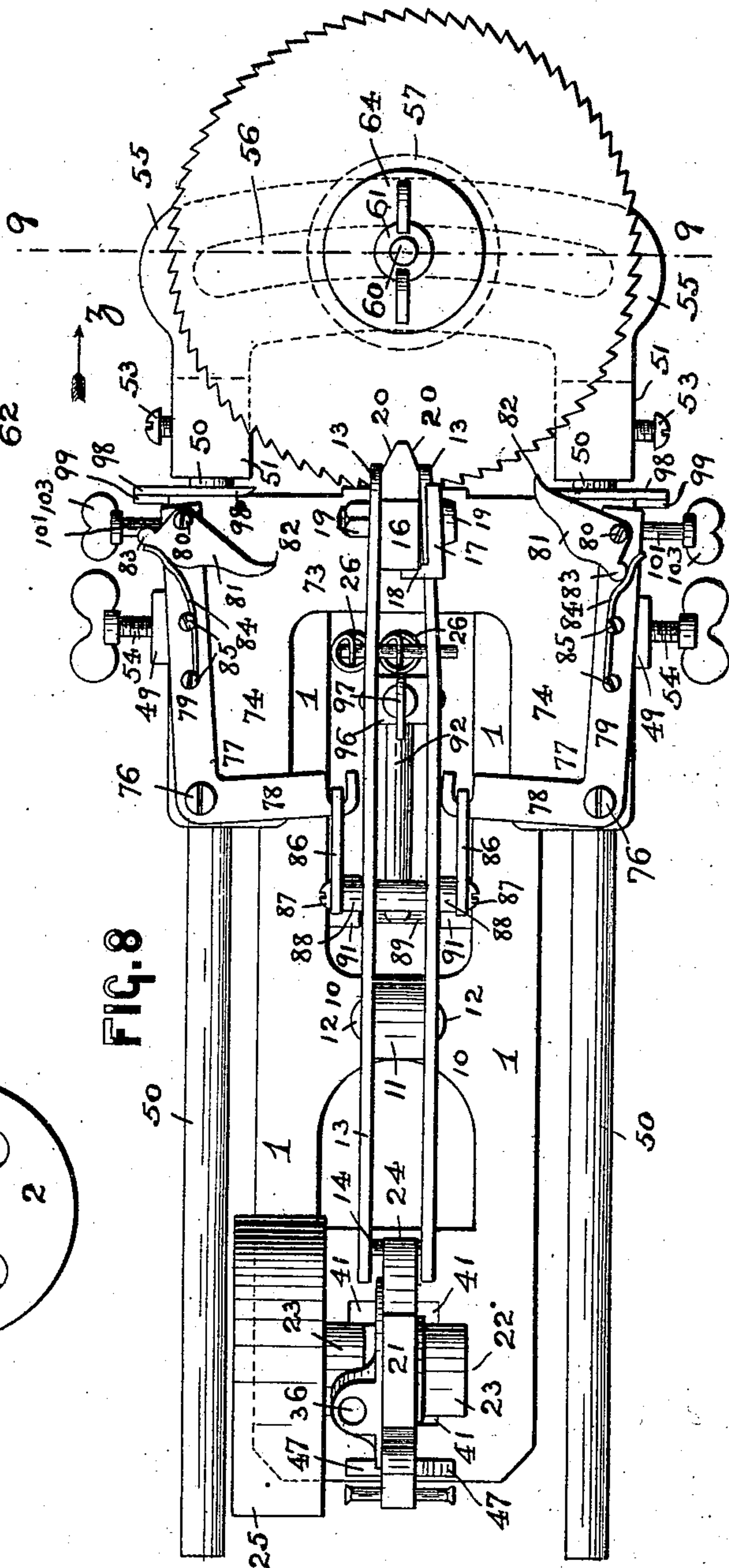
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UNITED STATES PATENT OFFICE.

JOSEPH GOTTMANN, OF NEWARK, NEW JERSEY.

APPARATUS FOR SETTING SAW-TEETH.

SPECIFICATION forming part of Letters Patent No. 680,484, dated August 13, 1901.

Application filed March 14, 1901. Serial No. 51,066. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH GOTTMANN, a citizen of the United States, residing at Newark, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Apparatus for Setting Saw-Teeth; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to figures of reference marked thereon, which form a part of this specification.

This invention has reference to improvements in that class of machines employed for the setting of the teeth of saws; and the present invention has for its primary object to provide a novel and simply-constructed machine for the purposes of setting the teeth of either band or circular saws whereby this work can be accomplished very rapidly and with a minimum cost of expense.

The invention has for its further object to provide, in connection with the saw-set hereinafter more fully described, an adjusting mechanism for feeding the saw-teeth beneath the setting-hammer, which mechanism can be set to enable the same to be employed with saws having small or large teeth and still be effective for properly setting the saw-teeth.

The invention therefore consists in the novel construction of machine for setting saw-teeth, hereinafter set forth; and, furthermore, the invention consists in such novel arrangements and combinations of parts as will be more fully described in the accompanying specification and then finally embodied in the clauses of the claim.

The invention is clearly illustrated in the accompanying drawings, in which—

Figure 1 is a plan or top view of the apparatus, and Fig. 2 is a side elevation of the same, both views showing the apparatus in use for the setting of the teeth of a band or flat saw. Fig. 3 is a longitudinal vertical section of the apparatus, said section being taken on line 3 3 in Fig. 1 of the drawings and representing the setting-hammer in its raised position about to be brought down upon a saw-tooth which is arranged over the anvil of the apparatus. Fig. 4 is a vertical

cross-section taken on line 4 4 of said Fig. 3 looking in the direction of the arrow x ; and Fig. 5 is a horizontal section of the front portion of the apparatus, the said section being taken on line 5 5 in Fig. 2 and looking in the direction of the arrows y in said figure. Fig. 6 is a plan or top view of the feeding mechanism for feeding a band-saw laterally across the saw-table and the teeth thereof above the anvil, the said mechanism in this view being shown in its set position for feeding the saw in an opposite direction laterally across the apparatus from that represented in Fig. 1 of the drawings. Fig. 7 is a front end view of the apparatus with the saw-table removed. Fig. 8 is a plan view of the apparatus, illustrating its use for setting the teeth of circular saws; and Fig. 9 is a vertical cross-section taken on line 9 9 in said Fig. 8 looking in the direction of the arrow z in said figure, illustrating more particularly a mandrel carrier or spindle and mandrel for rotatively arranging the circular saw in position upon the saw-table of the apparatus.

Similar numerals of reference are employed in all of the said above-described views to indicate corresponding parts.

In the said drawings, 1 indicates any suitable base or bed of the apparatus which is provided at the front with a downwardly-projecting rib or plate 2, provided, as will be seen from Fig. 7, with the screw-holes 3 for the reception of screws or bolts, by means of which the apparatus can be secured in position upon a suitable bench or table 4, as represented in Fig. 2 of the drawings, or by means of which rib or projection 2 the said apparatus can be arranged and held in the jaws of an ordinary vise, if desired. At or near the forward edge of the said table 1 and directly above the said rib or projection 2, as will be seen more particularly from an inspection of Fig. 3 of the drawings, are a pair of upwardly-extending projections or holding-jaws 5 and 6, between which is removably arranged and held in position by means of a set-screw 7 or in any other suitable manner the anvil 8. The said anvil is provided with the chamfered or beveled edge 9, on which the saw-tooth which is to be set is arranged prior to the striking of the tooth by the setting-hammer. Upon a cross-piece 10 or other

suitably-constructed part of the plate or bed 1 of the apparatus is an upright or post 11, to which is fulcrumed on a pivotal pin 12 a pair of arms 13. The said arms 13 are suitably connected at the back by a pin 14 and at the front by a pin 15, upon which is arranged a steel block 16, forming the setting-hammer hereinabove mentioned. This block 16 is preferably loosely arranged on said pin 16, being held in its proper and in an adjustable position upon said pin 15 and between the forward ends of the arms 13 by a projection or lug 18 of a dog 17, which is secured against the one side of one of said arms 13 when the pin 19 is screwed up tightly by means of the head and nut on said pin, as will be clearly understood from an inspection of the several figures of the drawings. The hammer 16 can thus be held in the inclined position indicated in Figs. 2 and 3, with the back edge of the hammer resting against the lug 18, as shown in Fig. 2, and held in its adjusted position, according to the angular set of the saw-tooth desired, by firmly tightening up the forward ends of the said arms 13 against the sides of the hammer 16, when the pin 19 is screwed in the screw-threaded perforation in the forward end of the one arm 13 by means of the head and nut on said pin. The said hammer 16 is preferably made wider at the top than at the bottom, being formed at the bottom with the chamfered sides 20, as shown in Fig. 7, whereby the hammer can be used for setting small saw-teeth. The said setting-hammer 16 and its pivoted or fulcrumed arms 13 are actuated by means of a tripping mechanism. (Illustrated more particularly in Figs. 1, 2, and 3 of the drawings.) This tripping mechanism consists, essentially, of a ratchet-wheel 21, which is suitably secured in a fixed position upon a shaft 22, the said shaft 22 being rotatably arranged in the bearings of a pair of uprights or posts 23, extending in an upward direction at the back of the said bed or plate 1 of the apparatus. The said shaft or spindle 22 may be rotated by means of a pulley 25 by power, whereby the teeth 24 of the said ratchet-wheel 21 are successively brought in sliding engagement with the pin 14 at the back of the said arms 13, and said arms 13 and hammer are raised, as shown in Fig. 3. When the hammer has been raised and the engaging tooth of the ratchet-wheel 21 has passed the pin 14, a pair of springs 26, which have their respective ends connected with a pin 27 between the arms 13 and a pin 28 on the bed or plate 1, will cause the striking edge of the hammer 16 to be brought with great force upon the saw-tooth placed beneath the hammer and above the beveled edge 9 of the anvil 8, whereby said tooth will be thrown out to one side of the saw-blade, and thus become set. When it is desired to actuate the arms 13 and their hammer 16 by hand, the said ratchet-wheel 21 is formed with a recessed part 29, thereby providing a suitable chamber, as will be clearly seen from Fig. 3 of the drawings, the said chamber being provided in its inner cylindrical surface with a number of steps or tooth-like parts 30, as shown. Loosely arranged upon the shaft or spindle 22 within the said recessed part 29 or chamber of said ratchet-wheel 21 is a disk 31, which is provided in its cylindrical edge with a socket 32, in which is arranged and partly projects from said socket a stud or pin 34, the said pin 34 being forced in sliding contact with the inner surface and with the tooth-like parts 30 by a suitable spring 33. The said disk 31 is also formed at the one side with an annular flange 35, which is provided at one side with a socket 36 for the reception of the end 38 of an actuating-lever 37. Thus when the parts are in their normally-inoperative positions (indicated in Fig. 2) and the end 38 of the handle 37 is inserted in the socket 36 a downward movement of said handle by pressure brought to bear thereon will rotate the disk 31 on the spindle or shaft 22 until the stud 34 comes in contact with one of the tooth-like parts or stops 30 of the ratchet-wheel 21, whereby said wheel 21 is then rotated with the said spindle 22, bringing one of its teeth or ratchets 24 in operative engagement with the pin 14 for raising the arms 13 and their hammer in the manner hereinabove set forth. The lever 37 can then be returned to its former position, causing the stud to slide over the inner surfaces of the stops 30 without actuating the disk or ratchet-wheel 21, as will be evident, until said lever 37 is again depressed for the next setting action of the hammer. In order that the tripping mechanism may be capable of an adjustment longitudinally upon the face of the bed 1 of the apparatus, the uprights or posts 23 are connected at or near the bottom with a cross-piece 39, from the bottom of which extends a lug 40, which fits in an opening 41 in the said base or bed 1, as shown in Fig. 3. A suitable washer 42 and set-screw 43 are employed for securing the said parts securely in their adjusted position on said base or bed 1. The longitudinal movement of the part 39 and the posts or uprights 23 thereon is produced by a suitable adjusting-screw 44, having a head 45 and annular shoulder 46, by means of which it is rotatably arranged in the slotted bearing 47, and the screw end 48 of said screw works in a screw-threaded hole in the said cross-piece 39. It will thus be seen that when the adjusting-screw 44 is turned it remains in its rotatively-fixed position, while the cross-piece 39 and posts thereon can be moved back and forth and are properly adjusted to provide for the proper sliding engagement of the teeth 24 of the ratchet-wheel 21 with the pin 14 of the hammer-arms 13. This adjustment varies the point at which the trip-tooth 24 engages and disengages with the pin 14, whereby the operator can suitably ad-

just the lift of the hammer and regulate the force of the blow to be delivered upon the saw-tooth.

I will now describe the arrangement and construction of the saw-supporting table and actuating and adjusting mechanism connected therewith.

On opposite sides of the base or bed 1 of the apparatus are a pair of perforated guides 49, in each of which is slidably arranged, so as to move in longitudinal directions, guide-rods 50, the said rods 50 having their forward ends secured in perforated lugs or projections 52 by means of set-screws 53 to a yoke-support 51, substantially as illustrated in Figs. 2, 5, and 8 of the drawings. The said guide-rods 50 can be secured in their adjusted position by means of set-screws 54, which are screwed into the guides 49, as represented more particularly in Fig. 5. The forward connecting member 55 of the yoke-support is provided with a curved slot 56, as shown, and adjustably arranged upon the upper surface of said member 55 and above said curved slot 56 is a support 57, preferably made in the manner of an inverted cone, the apex of which has been cut away to provide a frustum of a cone. This cone-shaped support 57 is provided with a correspondingly-shaped chamber 58, in which is an upwardly-extending stem or mandrel-carrier 59, which is provided at its upper portion with a screw-thread 60 and a nut 61. The under surface of the support 57 is provided with a downwardly-extending screw-threaded stud or post 62, which passes into and extends through the slot 56 in the member 55 and has a nut 63 on its free end for securely fastening the support in its adjusted position upon the upper surface of the said member 55. Resting directly upon the upper surface of the support 57 and suitably held in position thereon by means of the mandrel-carrier 59 and a cone-shaped mandrel 64 is the saw-table 65. The said saw-table 65 is also provided on its under side with downwardly-extending pins or posts 66, which project into and through the slot 56 in the member 55 and are for the purpose of retaining the saw table or platen 65 in its approximately adjusted position before being secured in place by means of the nut 61. The said table 65 is further provided with an arrangement of screw-threaded holes 67, (see Fig. 5,) in either of which can be screwed the thumb-screws 68, which extend into and through slots or openings 70 in a saw-holding plate 69, beneath the forward end of which and a pair of flat springs 71, secured to said plate 69, the flat band or other saw-blade is arranged and secured in position, with the teeth of the saw-blade arranged to be moved laterally across the top of the anvil 8. That the said saw-blade may be moved laterally the said holding or retaining plate 69 is provided at its forward edge and in its under surface with a groove 72, in which the blade is arranged and can slide, as will be clearly

evident from an inspection of Fig. 3. The slotted arrangement of the retaining-plate 69 and the possibility of securing the thumb-screws 68 in either of the screw-holes 67 allows of a large range of adjustment for retaining saw-blades of different widths and different sizes of saw-teeth in the saw-blade-retaining groove 72 in the forward edge of the plate 69.

The mechanism for feeding the saw-blade laterally across the apparatus, either to the right, as indicated in Fig. 1, or to the left, as indicated in Fig. 2, consists, essentially, of a frame 73, which is secured, by means of the screws 75, upon the projection or jaw 6 of the base or bed 1 and has a pair of rearwardly-extending members 74. At or near the rear end of each member 74 is a pivot 76, and upon each pivot 76 is placed a suitably-constructed bell-crank 77. Each bell-crank 77 comprises a pair of arms 78 and 79. At or near the free end of each arm 79, movably arranged upon a pivot 80, is a dog 81, each dog being provided with a sharp edge 82, which can be brought in engagement with a saw-tooth for laterally moving the saw across the anvil of the apparatus. Each dog 81 is provided with a suitable projection, as 83, against which can be brought the flat springs 84, which are secured in position upon the respective arms 79 by the screws 85. From an inspection of Figs. 1 and 6 it will be seen that these two dogs 81 can be set either as shown in said Fig. 1, whereby the saw-blade will be moved laterally across the apparatus from the right to the left, or as shown in Fig. 6, whereby the saw-blade can be moved across the apparatus in the opposite direction, or from the left to the right. To cause the dog 81 to engage a saw-tooth and feed the saw-blade laterally above the anvil after the one saw-tooth has been set and bring another saw-tooth above the anvil for setting said tooth, the arms 78 of the bell-cranks 77 are connected with links 86, which are pivotally connected at their opposite ends by means of the screws 87 to a laterally-extending arm 88 of a suitably-constructed bell-crank 89. Said bell-crank 89 is pivotally arranged upon a pivotal support or pin 90 in the bearing-lugs 91 of the base or bed 1 of the apparatus, and the forwardly-extending arm 92 of said bell-crank 89 is pivotally connected by means of a pin 93 with a yoke 94. To this yoke 94 is secured the lower end of an adjusting-screw 95, which extends in an upward direction, as shown, and is secured in a nut 96, which is pivotally arranged between the two hammer-arms 13. This adjusting-screw 95 is provided at its free end at the top with a finger-piece 97 for turning the same, and being rotatively arranged at the bottom in a suitable hole in the yoke or saddle 94 said screw can be raised or lowered in its nut 96, whereby the arm 92 of the bell-crank 89 is correspondingly raised or lowered, and by this manipulation and the arrangement of the intermediate arms and links

connected with the bell-cranks 77 the latter are actuated in such a manner that the dogs 81 will receive a greater or shorter stroke or movement, according to the size of the saw-teeth or the distance the teeth are to be moved laterally across the top of the anvil for the proper setting of the same. Slidably arranged along the edge of the frame 73 are a pair of adjustable guides 98, each guide being provided with a flange 99, extending at a right angle directly beneath the under surface of the said frame 73 and being formed with a screw-threaded lug 100, as shown more particularly in Fig. 5, the said lugs 100 being movably and adjustably arranged upon the screws 101, which turn in the bearings 102 on the under surface of the frame 73 and are manipulated by finger-pieces 103. The purpose of the said guides 98 is to permit the gripping edge 82 of the actuating-dog 81 to slide against the same when the parts are to remain inactive and while the hammer is being brought down upon the previously-adjusted saw-tooth for the setting of the latter and to prevent the gripping edge of the dog 81 engaging with the next saw-tooth until said edge 82 has reached the end of said guide, as shown in Fig. 1, and then engages with the saw-tooth at that point for the proper adjustment and lateral movement of the saw-blade to bring the next tooth which is to be set directly above the anvil and beneath the descending hammer.

When the saw-setting apparatus is to be used with circular saws for the setting of the teeth thereof, all that is necessary is to remove the table or platen 65 from above the support 57, placing the circular saw on said support and arranging the mandrel 64 and the nut 61 upon the mandrel-spindle 59 in the manner illustrated in Fig. 9, the frame 51, which is connected with the guide rods or bars 50, in that case having been pulled forward far enough and secured in its adjusted position by the set-screws 54, that the saw-teeth of the saw when the same is turned step by step by means of the dogs 81 in the manner hereinabove described will be brought directly above the anvil 8 and directly beneath the striking edge of the hammer 16. In all other respects the arrangements and construction of the remaining parts of the apparatus remain the same as hereinabove fully set forth, and the respective dogs 81 are set to feed the teeth of the circular saw directly upon the anvil in either direction, according to which side of the saw-body the saw-tooth is to be set.

The workings of the several mechanisms comprising the embodiment of my novel construction of saw-set will be clearly understood from the accompanying drawings and from the previous description of the same, and it will be clearly evident that I have devised a simply-constructed apparatus in which the alternate teeth of saws of different widths and different sizes of teeth can be ef-

fectually set, and the apparatus can be employed both for the setting of the saw-teeth of band-saws as well as circular saws.

I am aware that changes may be made in the several arrangements and combinations of the various parts, as well as in the details of the construction thereof, without departing from the scope of my invention. Hence I do not limit my invention to the exact arrangements and combinations of the various parts as described in the accompanying specification and as illustrated in the drawings, nor do I confine myself to the exact details of the construction thereof.

Having thus described my invention, what I claim is—

1. In a saw-set, the combination, with the bed, and anvil, of a vibratory hammer, means for actuating said hammer, and a saw-supporting table, adjustable longitudinally toward or from the anvil, and means for feeding each alternate saw-tooth above said anvil, consisting, essentially, of a dog adapted to engage said saw-teeth, mechanism on said bed for actuating said dog, and means connected with said dog-actuating mechanism and said vibratory hammer, substantially as and for the purposes set forth.

2. In a saw-set, the combination, with the bed, and anvil, of a vibratory hammer, means for actuating said hammer, a saw-supporting table, adjustable longitudinally toward or from the anvil, and means on said table for retaining a saw-blade in position, consisting of an adjustable gage 69, having slotted portions and screws for securing said gage in its adjusted positions upon said table, and means for feeding each alternate saw-tooth above said anvil, consisting, essentially, of a dog adapted to engage said saw-teeth, mechanism on said bed for actuating said dog, and means connected with said dog-actuating mechanism and said vibratory hammer, substantially as and for the purposes set forth.

3. In a saw-set, the combination, with the bed and anvil, of a vibratory hammer, means for actuating said hammer, a saw-supporting table on which the saw is to be arranged, and means for feeding each alternate saw-tooth above said anvil, consisting, of a spring-actuated dog arranged to be forced in engagement with a saw-tooth and also to be disengaged therefrom, mechanism on said bed for actuating said dog, and an adjusting means connected with said dog-actuating mechanism and said vibratory hammer for actuating said dog-actuating mechanism and also regulating the throw of said dog, substantially as and for the purposes set forth.

4. In a saw-set, the combination, with the bed and anvil, of a vibratory hammer, means for actuating said hammer, a saw-supporting table on which the saw is to be arranged, and means for feeding each alternate saw-tooth above said anvil, consisting, essentially, of a bell-crank 89 pivotally arranged upon said bed of the machine, a pair of bell-cranks 77,

connecting-links between said bell-cranks 77 and 89, and a spring-actuated dog 81 on each bell-crank 77 arranged to be forced in engagement with a saw-tooth and also to be disengaged therefrom, and a means of adjustment for regulating the throw of each dog, substantially as and for the purposes set forth.

5. In a saw-set, the combination, with the bed and anvil, of a vibratory hammer, means for actuating said hammer, a saw-supporting table on which the saw is to be arranged, and means for feeding each alternate saw-tooth above said anvil, consisting, essentially, of a bell-crank 89 pivotally arranged upon said bed of the machine, a pair of bell-cranks 77, connecting-links between said bell-cranks 77 and 89, a spring-actuated dog 81 on each bell-crank 77 arranged to be forced in engagement with a saw-tooth and also to be disengaged therefrom, and an adjusting-screw connecting said bell-crank 89 with the hammer for regulating the throw of each dog, substantially as and for the purposes set forth.

6. In a saw-set, the combination, with the bed and anvil, of a vibratory hammer, means for actuating said hammer, a saw-supporting table on which the saw is to be arranged, a supporting-frame, means for feeding each alternate saw-tooth above said anvil, consisting, of a system of pivotally-arranged bell-cranks, a spring-actuated dog 81 pivotally arranged on one of said bell-cranks, and a guide slidably and adjustably arranged along the edge of said frame, against which said dog is brought during a part of its movement, substantially as and for the purposes set forth.

7. In a saw-set, the combination, with the bed and anvil, of a vibratory hammer, means for actuating said hammer, a saw-supporting table on which the saw is to be arranged, a supporting-frame, means for feeding each alternate saw-tooth above said anvil, consisting, of a system of pivotally-arranged bell-cranks, a spring-actuated dog 81 pivotally arranged on one of said bell-cranks, a guide slidably and adjustably arranged along the edge of said frame, and means for adjusting said guide, consisting, of a flange 99 on said guide, a screw-threaded lug 100, and an adjusting-screw 101 arranged in bearings on the under surface of said frame and turning in said lug 100, substantially as and for the purposes set forth.

8. In a saw-set, the combination, with the bed and anvil, of a vibratory hammer, means for actuating said hammer, guides on said bed, guide-rods adjustably arranged in said guides, and a saw-supporting means connected with said guide-rods, substantially as and for the purposes set forth.

9. In a saw-set, the combination, with the bed and anvil, of a vibratory hammer, means for actuating said hammer, guides on said bed, guide-rods adjustably arranged in said guides, a yoke-support secured to said guide-rods, and a saw-supporting table adjustably

arranged upon said yoke-support, substantially as and for the purposes set forth.

10. In a saw-set, the combination, with the bed and anvil, of a vibratory hammer, means for actuating said hammer, guides on said bed, guide-rods adjustably arranged in said guides, a yoke-support secured to said guide-rods, provided with a slotted member 55, a support 57 on said member 55, a screw-threaded mandrel-carrier connected with said support 57, a saw-supporting table on said support 57, and means on said mandrel-carrier for securing said table in position, substantially as and for the purposes set forth.

11. In a saw-set, the combination, with the bed and anvil, of a vibratory hammer, a yoke-support, having a curved slot, connected with said bed, means for actuating said hammer, a hollow cone-shaped support 57, having a post slidably arranged in said slot, and means on said post for securing said cone-shaped support in its adjustable position on said yoke-support, a mandrel-carrier connected with said support, and a mandrel 64 on said mandrel-carrier, substantially as and for the purposes set forth.

12. In a saw-set, the combination, with the bed, provided with a pair of holding-jaws 5 and 6, and guides connected with said bed, of an anvil arranged and held in position between said jaws, guide-rods adjustably arranged in said guides a yoke-support, having a curved slot, secured to said guide-rods, and a vibratory hammer, a hollow cone-shaped support 57 having a post slidably arranged in said slot, means on said post for securing said cone-shaped support in its adjustable position upon said yoke-support, a mandrel-carrier connected with said cone-shaped support, and a mandrel on said mandrel-carrier, substantially as and for the purposes set forth.

13. In a saw-set, the combination, with the bed, provided with a pair of holding-jaws 5 and 6, of an anvil arranged and held in position between said jaws, a saw-supporting table, a vibratory hammer, a supporting-frame 73 secured upon said jaw 6, bell-cranks pivotally arranged upon said frame 73, and spring-actuated dogs 81 pivotally arranged upon said bell-cranks, and a connecting means between said bell-cranks, and the vibratory hammer adapted to actuate said bell-cranks and force the dogs, in engagement with a saw-tooth, substantially as and for the purposes set forth.

14. In a saw-set, the combination, with the bed, provided with a pair of holding-jaws 5 and 6, of an anvil arranged and held in position between said jaws, a saw-supporting table, a vibratory hammer, a supporting-frame 73 secured upon said jaw 6, and means on said frame 73 for feeding each alternate saw-tooth above said anvil, consisting, essentially, of a bell-crank 89 pivotally arranged upon said bed of the machine, a pair of bell-cranks 77 pivotally arranged on said frame 73, connect-

ing-links between said bell-cranks 77 and 89, and a spring-actuated dog 81 on each bell-crank 77 arranged to be forced in engagement with a saw-tooth and also to be disengaged therefrom, substantially as and for the purposes set forth.

15. In a saw-set, the combination, with the bed, provided with a pair of holding-jaws 5 and 6, of an anvil arranged and held in position between said jaws, a saw-supporting table, a vibratory hammer, a supporting-frame 73 secured upon said jaw 6, and means on said frame 73 for feeding each alternate saw-tooth above said anvil, consisting, essentially, of a bell-crank 89 pivotally arranged upon said bed of the machine, a pair of bell-cranks 77 pivotally arranged on said frame 73, connecting links between said bell-cranks 77 and 89, a spring-actuated dog 81 on each bell-crank 77 arranged to be forced in engagement with a saw-tooth and also to be disengaged therefrom, and an adjusting-screw connecting said bell-crank 89 with the hammer for regulating the throw of each dog, substantially as and for the purposes set forth.

16. In a saw-set, the combination, with the bed, an anvil, and a vibratory hammer, of means for actuating said hammer, comprising, a shaft, a chambered ratchet-wheel on said shaft having ratchet-teeth adapted to engage a trip-pin on the hammer-arm, a disk 29 within said chambered ratchet-wheel, loosely arranged on said shaft, tooth-like steps within the chambered portion of said ratchet-wheel, and means on said disk in slidable engagement with said tooth-like steps for actuating the said shaft and the ratchet-wheel on said shaft, substantially as and for the purposes set forth.

17. In a saw-set, the combination, with the bed, an anvil, and a vibratory hammer, of means for actuating said hammer, comprising, a shaft, a chambered ratchet-wheel on said shaft having ratchet-teeth adapted to engage a trip-pin on the hammer-arm, a disk 29 within said chambered ratchet-wheel, loosely arranged on said shaft, tooth-like steps within the chambered portion of said ratchet-wheel, and means on said disk in slidable engagement with said tooth-like steps for actuating the said shaft and the ratchet-wheel on said shaft, consisting, es-

entially, of a spring-actuated stud in a socket in said disk 29, a flange on said disk, and a receiving-socket for a handle on said flange, substantially as and for the purposes set forth.

18. In a saw-set, the combination, with the bed, and anvil, of an upright on said bed, a vibratory hammer fulcrumed on a pivotal pin on said post, means for actuating said hammer, a saw-supporting table, and means for feeding each alternate saw-tooth above the said anvil, consisting, essentially, of dogs adapted to engage said saw-teeth, a system of bell-cranks with which said dogs are pivotally connected, and means connected with said hammer and said bell-cranks for actuating said bell-cranks, substantially as and for the purposes set forth.

19. In a saw-set, the combination, with the bed, and anvil, of an upright on said bed, a vibratory hammer fulcrumed on a pivotal pin on said post, means for actuating said hammer, a saw-supporting table, and means for feeding each alternate saw-tooth above said anvil, consisting, essentially, of dogs adapted to engage said saw-teeth, a system of bell-cranks with which said dogs are pivotally connected, and an adjusting means connected with said hammer, and said bell-cranks for actuating said bell-cranks, and also regulating the throw of said dogs, substantially as and for the purposes set forth.

20. In a saw-set, the combination, with the bed, and anvil, of an upright on said bed, a vibratory hammer fulcrumed on a pivotal pin on said post, means for actuating said hammer, a saw-supporting table, means for feeding the saw-teeth above the anvil, a system of bell-cranks for actuating said saw-tooth-feeding means, a nut on said hammer, and an adjusting-screw connected with said bell-cranks and the nut connected with said hammer, substantially as and for the purposes set forth.

In testimony that I claim the invention set forth above I have hereunto set my hand this 12th day of March, 1901.

JOSEPH GOTTMANN.

Witnesses:

FREDK. C. FRAENTZEL,
GEO. D. RICHARDS.