

W. L. COVEL.  
SAW SWAGING MACHINE.  
APPLICATION FILED AUG. 2, 1907.

934,046.

Patented Sept. 14, 1909.

4 SHEETS—SHEET 1.

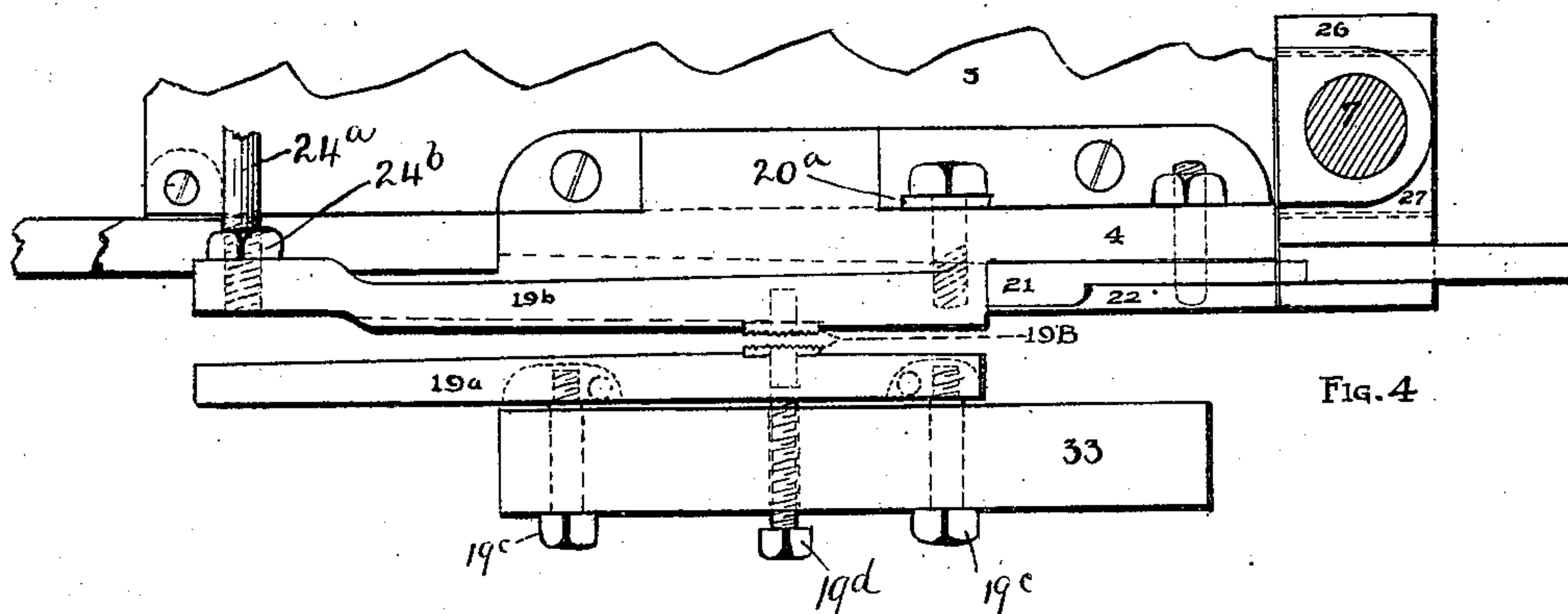


FIG. 4

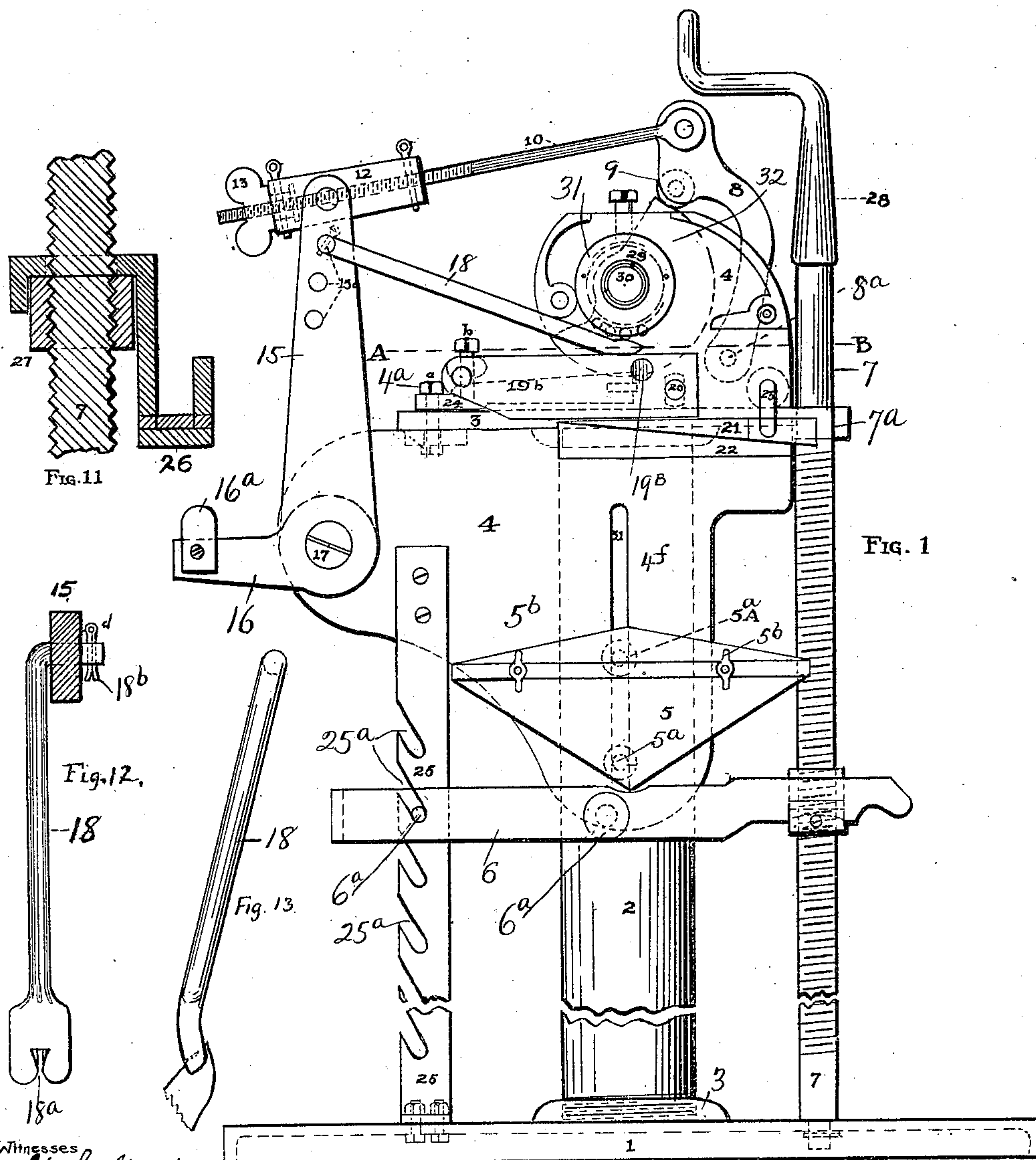


FIG. 1

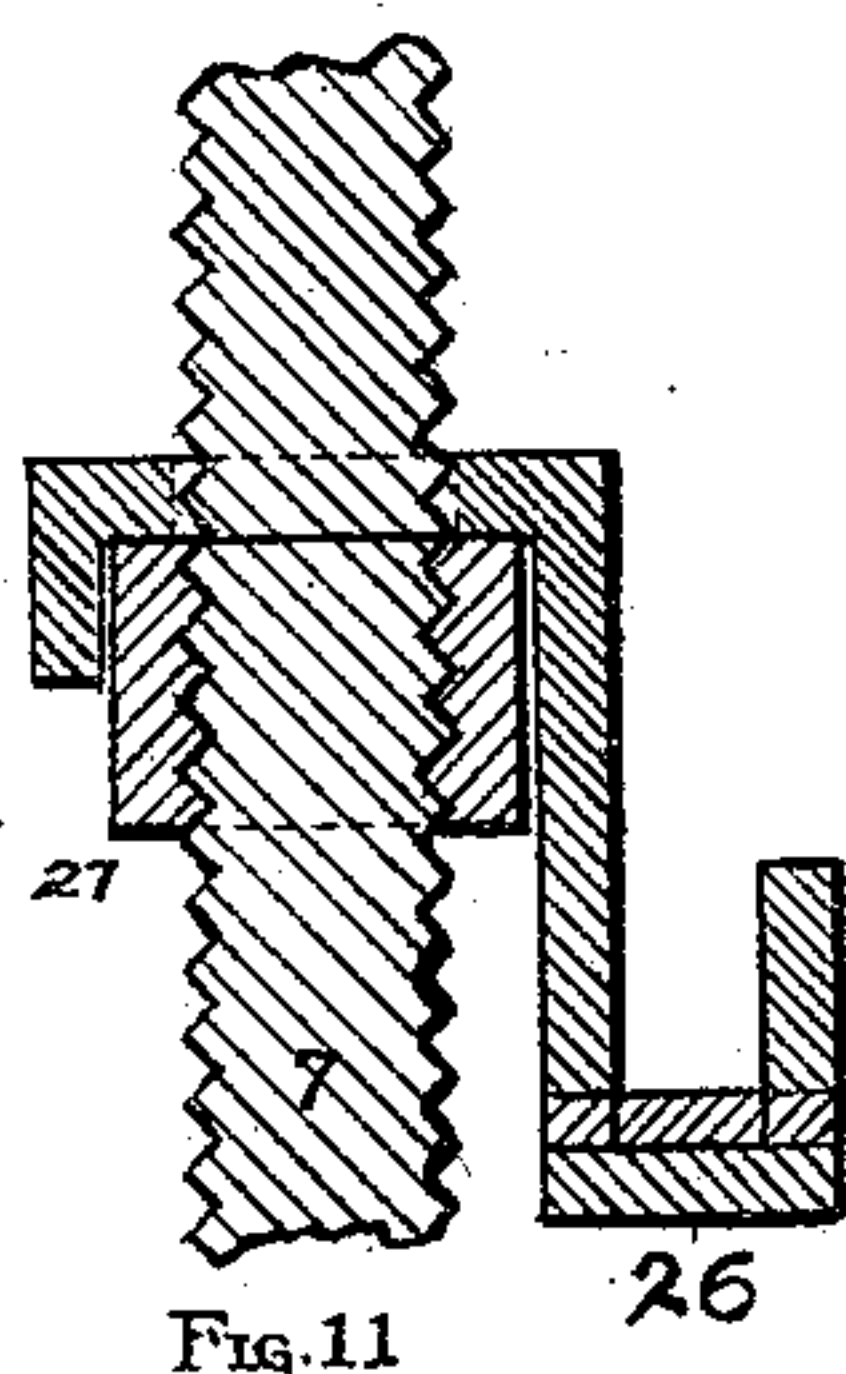


FIG. 11

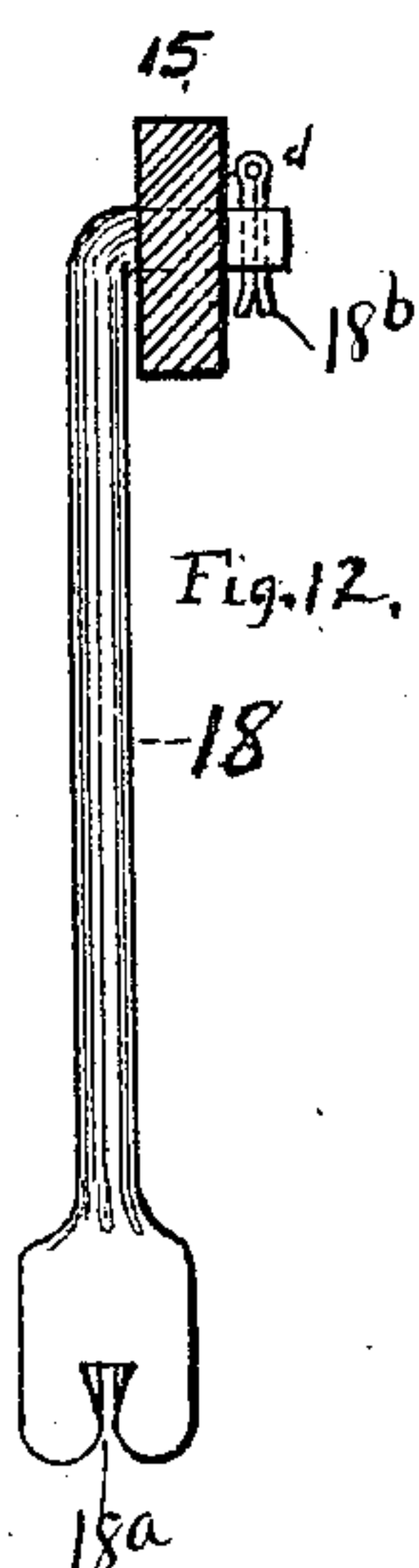


FIG. 12.

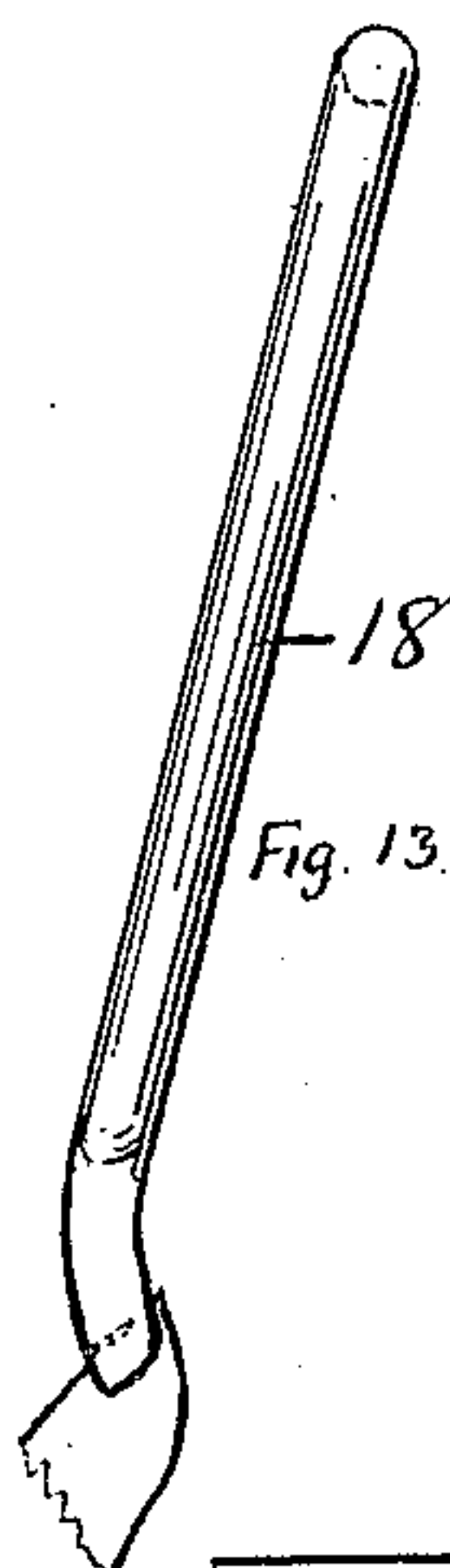


FIG. 13.

Witnesses  
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*William London Covel*

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4 SHEETS—SHEET 2.

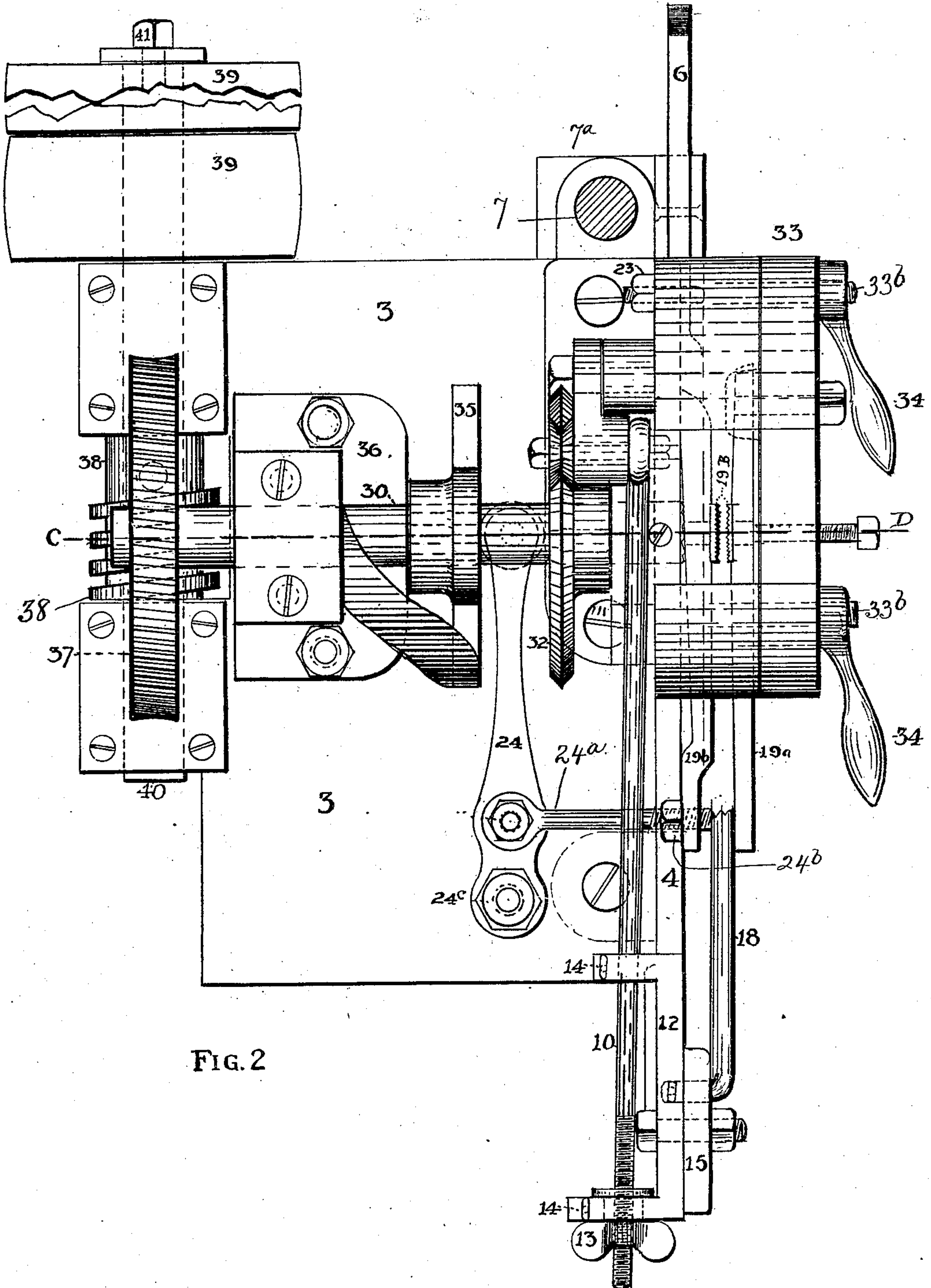


FIG. 2

WITNESSES

*H. L. Smith* — —  
*W. L. Smith* — —

INVENTOR

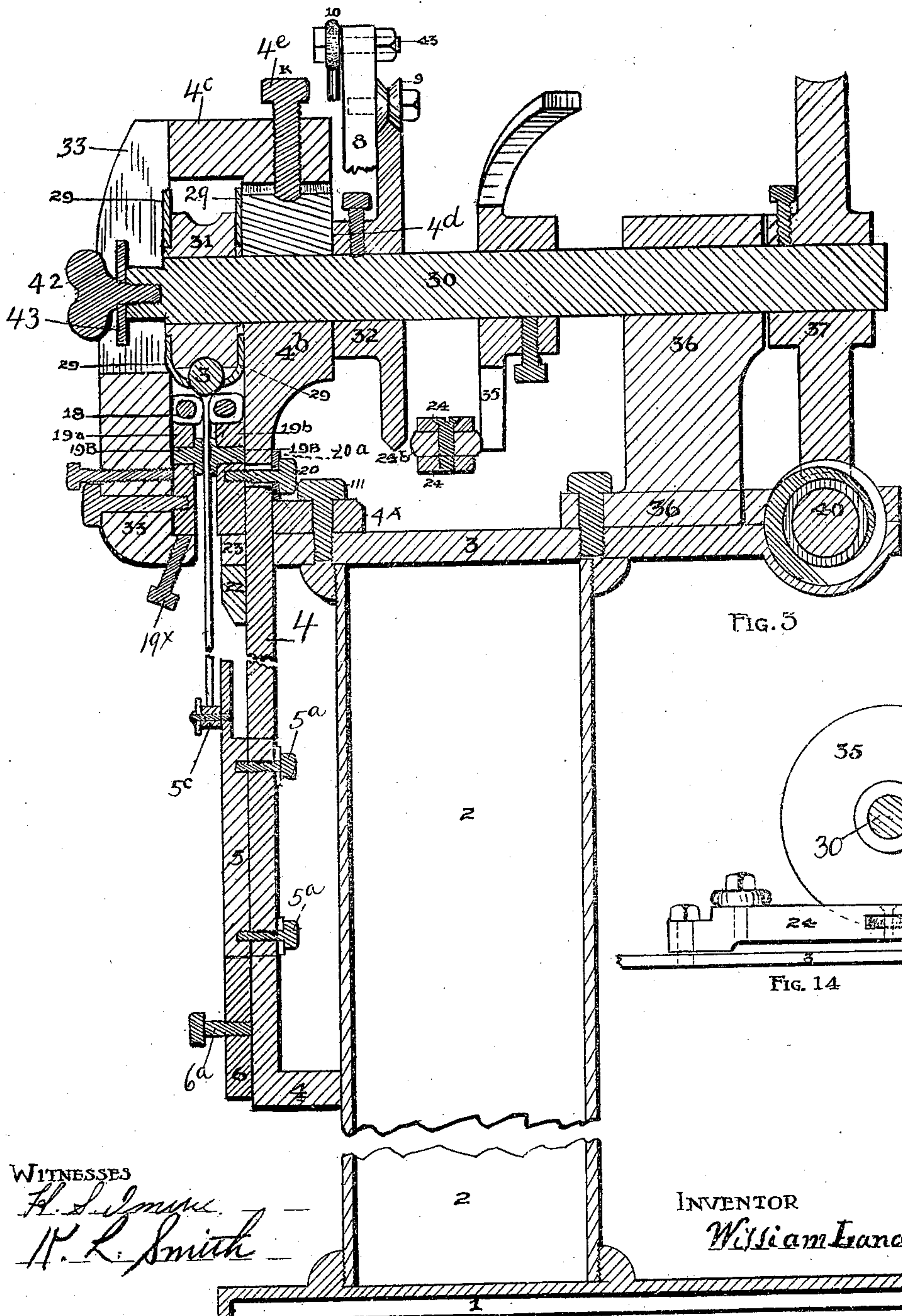
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4 SHEETS—SHEET 3.



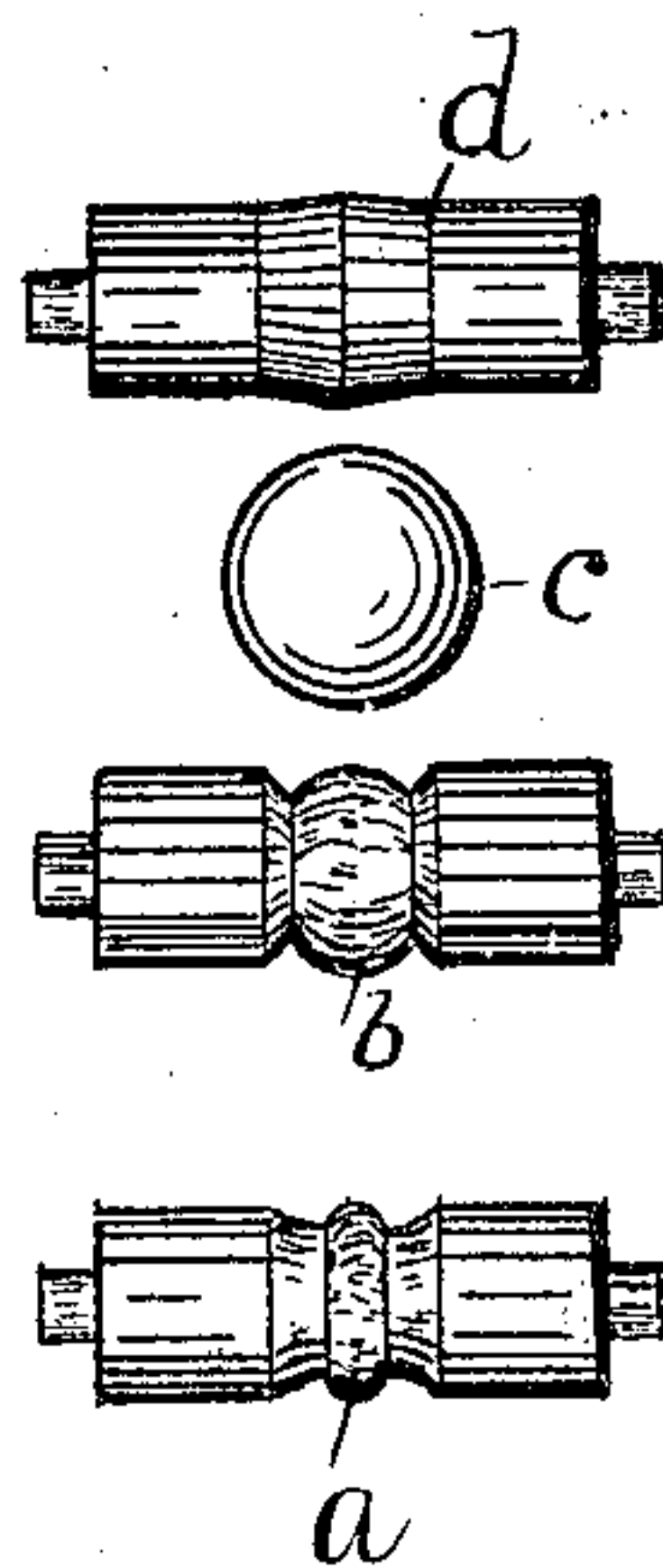
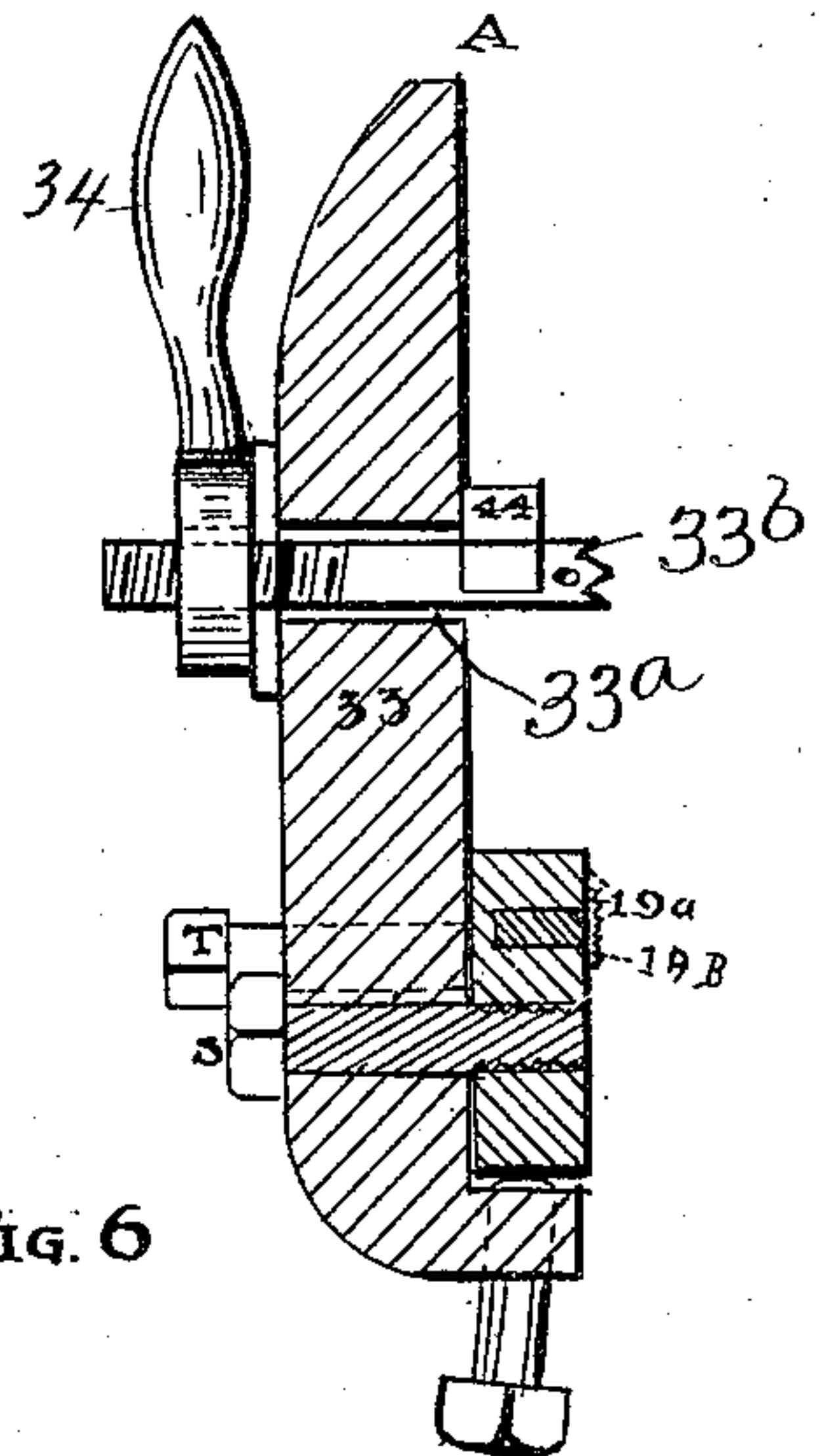
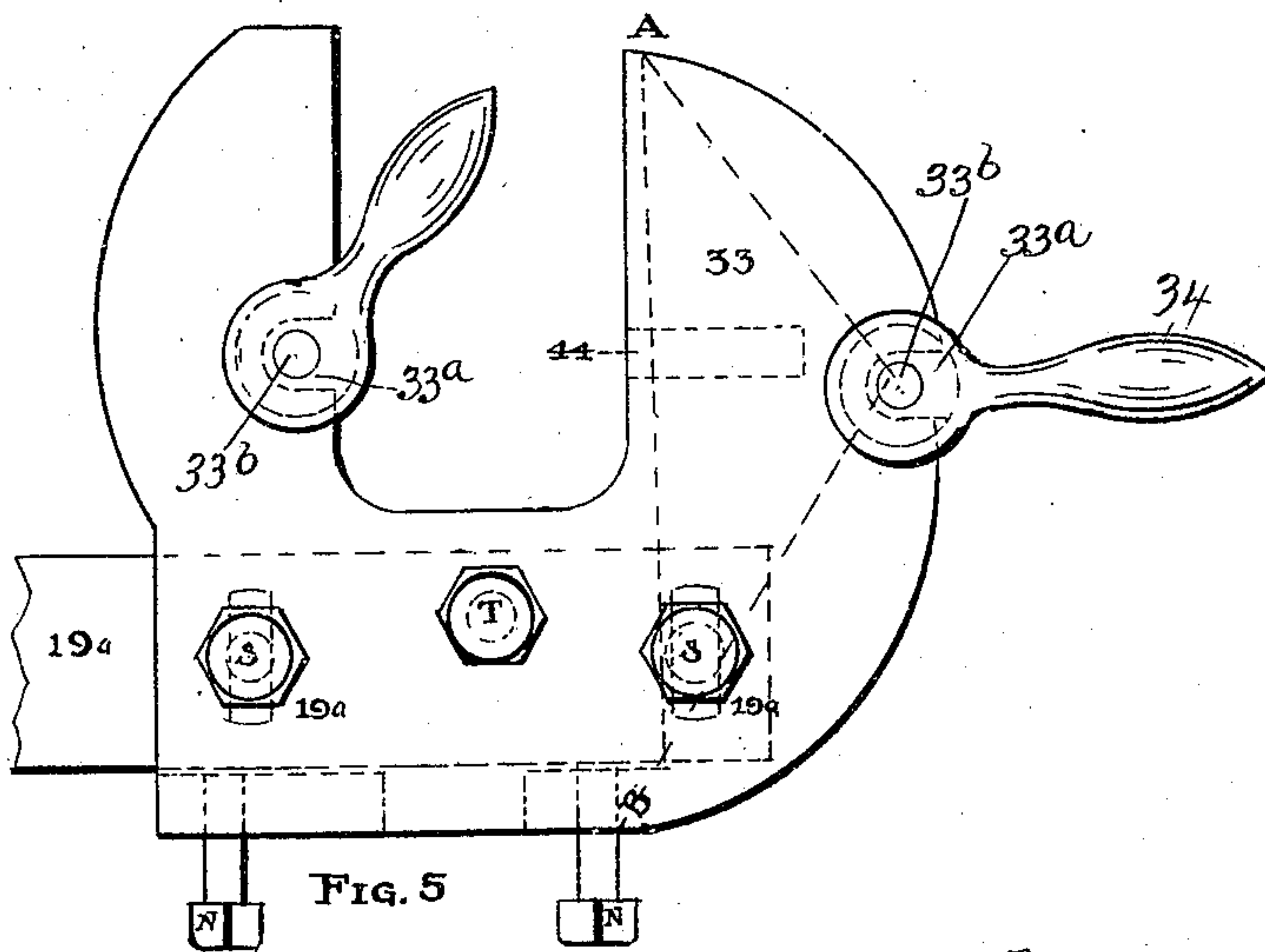
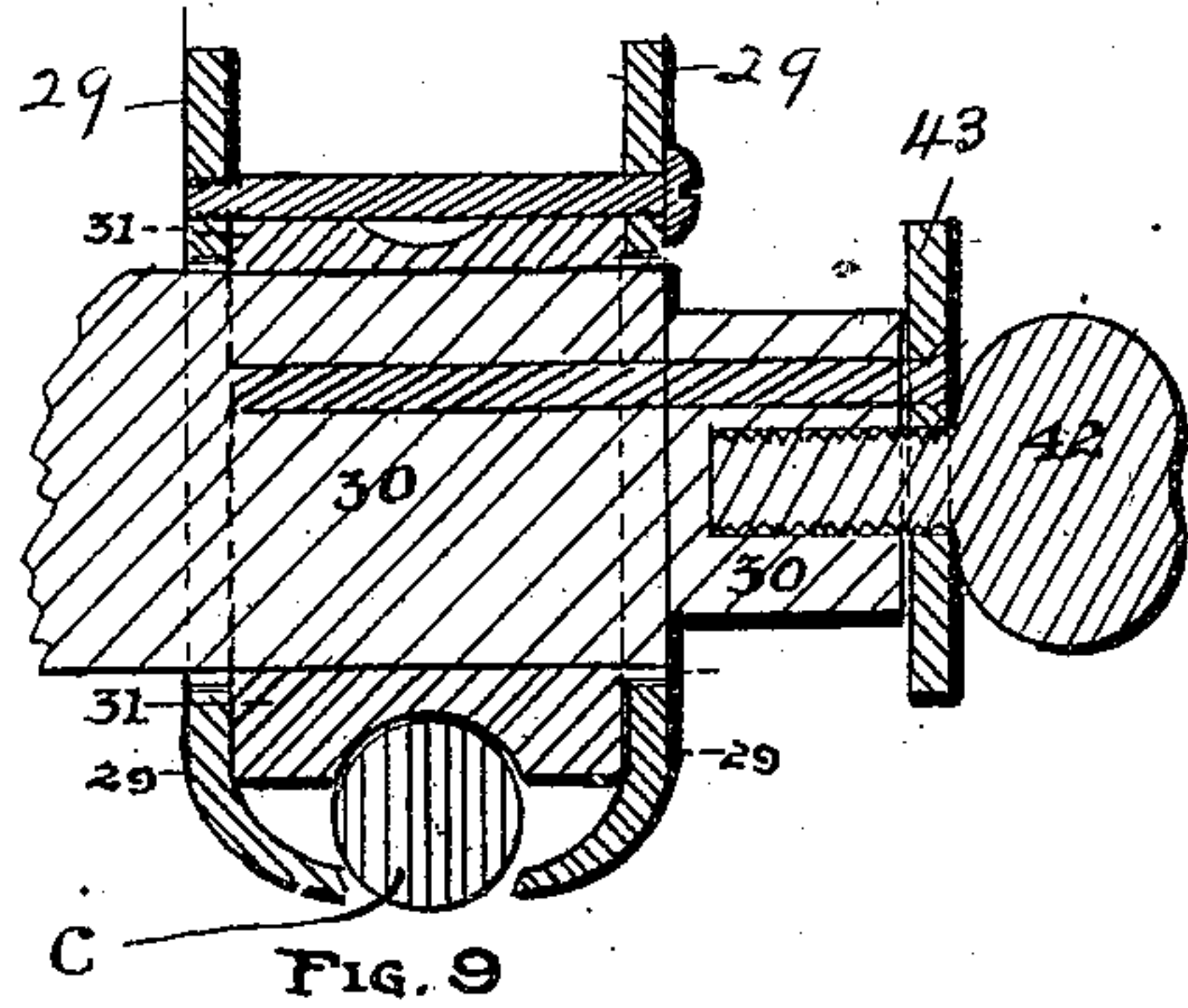
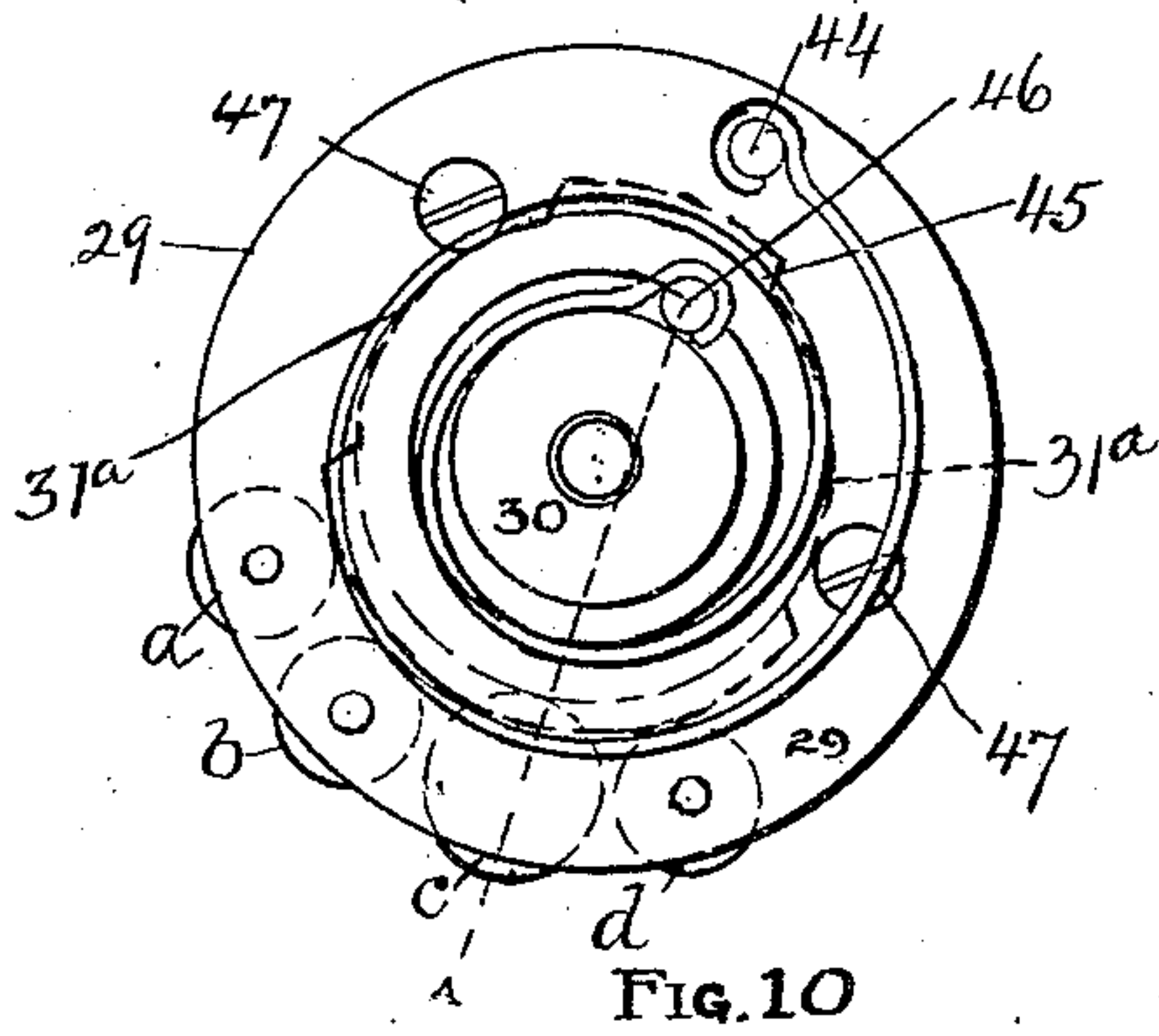
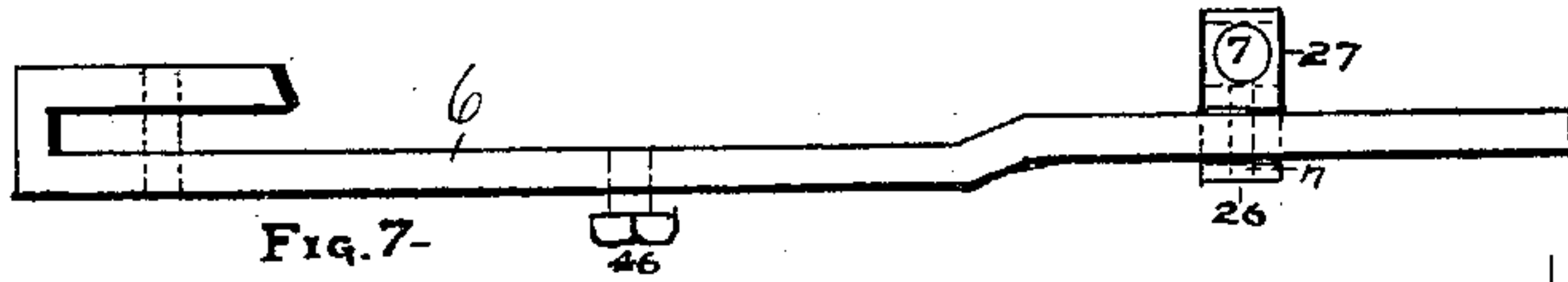
WITNESSES  
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4 SHEETS—SHEET 4.



WITNESSES

*H. A. Smith*

*R. L. Smith*

INVENTOR

*William Landon Covell*



# UNITED STATES PATENT OFFICE.

WILLIAM LANDON COVEL, OF BILOXI, MISSISSIPPI.

## SAW-SWAGING MACHINE.

934,046.

Specification of Letters Patent. Patented Sept. 14, 1909.

Application filed August 2, 1907. Serial No. 386,833.

*To all whom it may concern:*

Be it known that I, WILLIAM LANDON COVEL, of Biloxi, in the county of Harrison and State of Mississippi, have invented certain new and useful Improvements in Saw-Swaging Machines, of which the following is a specification.

This invention relates to certain improvements in saw swaging machines and more particularly in the machine shown in my Letters Patent No. 815,269 granted March 13, 1906.

The invention consists in the machine shown, in its preferable embodiment, in the drawings accompanying and forming part hereof and as will now be hereinafter more particularly described and then definitely claimed at the end hereof.

In the aforesaid drawings which represent the way I now prefer to carry out my invention: Figure 1 is a front elevation of my machine, with parts removed in order to better show the construction. Fig. 2 is a top plan with parts removed. Fig. 3 is a vertical central section taken on a line running through the main shaft. Fig. 4 is a detail showing the manner of clamping the saws. Figs. 5 and 6 are details of the face plate. Fig. 7 is a plan of a supporting bar. Fig. 8 shows the various forms of swaging rollers. Figs. 9 and 10 are detail views of the swaging head. Fig. 11 is a detail of the stirrup for engaging the supporting bar shown in Fig. 7. Figs. 12 and 13 are details of the feed rod. Fig. 14 is a detail of one of the cams and its connected parts operated thereby.

Referring now to the details of the drawings by numerals: 1 designates a suitable base or support to which is secured the standard 2 in any desired manner but preferably by means of the screw threaded annular flange shown in Figs. 1 and 3. To the upper part of the standard 2 is secured a table 3 which carries or supports all the material parts of the machine and to which is secured a vertically disposed plate 4 by means of the bolts 4<sup>a</sup> shown in Fig. 1. To the table 3 is also bolted an upright forming a bearing 36 and within this bearing 36 is supported the main shaft 30 the other end of which is supported by the enlarged part 4<sup>b</sup> of the plate 4. This plate 4 also extends above the shaft as shown at 4<sup>c</sup> and instead of babbitting, the upper part of the bearing is formed by means of a portion 4<sup>d</sup> shown

particularly in Fig. 3 and which is adjustably secured in position by means of the bolt 4<sup>e</sup> shown in the same figure and also in Fig. 1. The main shaft 30 is driven in a somewhat similar manner to that illustrated in my aforesaid Patent No. 815,269 in that it has secured to it a worm wheel 37 which is operated by a worm 38 driven from the shaft 40 by means of the pulleys 39 (see Figs. 2 and 3). At the opposite end of this shaft 30 is secured the swaging head 31 which while operating on the same general principle as that shown in my aforesaid patent is entirely different in its details and this head will be hereinafter more particularly described.

The plate 4 is provided with a vertical slot 4<sup>f</sup> to provide for vertical movement therein of two adjusting bolts 5<sup>a</sup> which project through the aforesaid slot into the saw carrier 5 shown particularly in Figs. 1 and 3. This carrier rests upon a supporting bar 6 shown in detail in Fig. 7 and in position in Fig. 1, and the supporting bar has one end which may be quickly adjusted as desired by hooking a stud or rivet 6<sup>a</sup> at one of its ends into one of the slots 25<sup>a</sup> in the vertically disposed support 25 which is bolted to the base 1 and to the vertical plate 4, as clearly illustrated in Fig. 1. The other end of the supporting bar 6 is hooked into a stirrup 26 shown in Fig. 11 and which stirrup is provided with a threaded nut 27 with which engages the vertically disposed adjusting screw 7 which is stepped into the base 1 and which is provided at the upper end with a cranked handle 28 by means of which it may be easily adjusted in a manner readily understood. From the foregoing it will be seen that since the saw support 5 rests on the supporting bar 6 and is adjustable up and down by means of its bolts 5<sup>a</sup> in the slots 4<sup>f</sup>, the said saw support 5 may be rapidly adjusted in approximately the proper position by hooking the studs or bolts 6<sup>a</sup> into that one of the slots 25<sup>a</sup> in the bar 25 which seems to be the appropriate one. And then the fine adjustment may be made from the other end of the supporting bar 6 by turning the cranked handle 28 and moving the bar 6 upwardly, and with it the saw support 5, until the saw is adjusted to a nicety. Before leaving the saw support, I may further state that the said support is provided with turning buttons 5<sup>b</sup> shown in Figs. 1 and 3, these buttons being so disposed that after the saw is placed upon



the supports 5<sup>c</sup> shown in Fig. 3, the buttons may be turned so as to be vertically disposed and hold the saw from slipping off sidewise. When the teeth of a band saw are to be swaged, the saw is supported upon the supports 5<sup>c</sup>, but when a circular saw is to have its teeth swaged, the saw may be secured directly to the supporting bar 6 by slipping it over a circular boss 6<sup>a</sup> shown in Figs. 1 and 3 and by properly adjusting the bar 6 the teeth of the saw may be brought into proper position for swaging.

After the saw is properly placed in position on the supports 5<sup>c</sup> projecting from the carrier 5, or if a circular saw is being swaged upon the support 6<sup>a</sup>, it is advisable to provide some means of clamping the saw during the swaging operation and I prefer to employ clamps like those shown at 19<sup>a</sup> and 19<sup>b</sup> in Fig. 4. The clamp 19<sup>b</sup> is movably secured in position, one end being supported by means of the bolt 20 provided under its head with a rubber gasket 20<sup>a</sup> so as to permit movement of the clamp 19<sup>b</sup> in a manner which will be hereinafter described. The other clamp 19<sup>a</sup> is secured to a removable face plate 33 (which will also be hereinafter more fully described) by means of the bolts 19<sup>c</sup> and 19<sup>d</sup>. The bolts 19<sup>c</sup> are loosely slipped through the face plate 33 and threaded into the clamp 19<sup>a</sup> while the bolt 19<sup>d</sup> is screwed in the face plate 33 and against the clamp 19<sup>a</sup>, this arrangement permitting the clamp 19<sup>a</sup> to be adjusted to or from the face plate 33 in a manner readily understood and as occasion requires. The clamps 19<sup>a</sup> and 19<sup>b</sup> are provided with removable clamping jaws 19<sup>B</sup> shown in Fig. 4 and also in Figs. 1, 3 and 6.

The face plate 33 which has been several times mentioned is formed of the construction shown particularly in Figs. 5 and 6 and from the examination of Fig. 5 it will be seen that this plate is roughly speaking of U-shape and the two vertical members of the U are provided with slots 33<sup>a</sup> through which project bolts 33<sup>b</sup> (see Fig. 2) which project from the vertically disposed plate 4 and the face plate is locked to these bolts by means of the locking handles 34 shown in Figs. 2, 5 and 6. The face plate 33 is made of the peculiar shape shown in Fig. 5 so that it may be slipped upwardly in position, the projecting part of the swaging head fitting within the vertically disposed slot in the face plate and when the face plate is in the proper position vertically, it is then moved horizontally until the horizontal slots 33<sup>a</sup> contain the bolts 33<sup>b</sup> when the locking handles 34 may be turned to clamp the face plate in position. And since one of the clamps 19<sup>a</sup> is bolted to the face plate 33 it follows that this clamp is also placed in position at the same time that the face plate 33 is placed on the machine.

It has been hereinbefore stated that the

clamp 19<sup>b</sup> is movably held in position and that one end is supported by means of the bolt 20 so as to permit a slight movement thereon owing to the employment of the rubber gasket 20<sup>a</sup>. To give this clamp 19<sup>b</sup> an automatic movement to clamp or release the saw, I connect it to a cam lever 24 by means of a rod 24<sup>a</sup> one end of which is pivoted to the cam lever 24 and the other end adjustably connected to the clamp by means of the screw thread end of the rod 24<sup>a</sup> and the adjusting nut 24<sup>b</sup>. It follows from this construction that the clamp may be adjusted as nicely as may be necessary in order to insure the proper clamping of the saw in the manner which will be fully described in the operation of the machine. The cam lever 24 is pivotally connected at 24<sup>c</sup> to the table 3 and its other end is provided with a roller which contacts with the cam 35 secured to the main shaft 30. This cam 35 is so formed that when the roller of the cam lever 24 bears on the flat face of the cam it is held in the position shown in Fig. 3, but when the cam rotates to the point where it will slip off of the end of the cam 35 (see Fig. 14), the cam lever 24 is permitted to move to the left as shown in Fig. 2 and thereby will permit the clamp 19<sup>b</sup> to release the saw which is being held between the clamps 19<sup>a</sup> and 19<sup>b</sup>. As the shaft continues to rotate, at the proper time, the roller 24<sup>a</sup> on the end of the cam lever 24 will be picked up by the curved end of the cam 35 and gradually moved to the right as shown in Fig. 2 and again clamp the saw in position.

In order to feed the saw one tooth at a time after it has been released from the clamps as has just been described, I employ a feed rod 18 quite similar to the feed rod of my aforesaid patent. This rod is shown detached in Figs. 12 and 13 and is shown in position in Fig. 1 and as there shown it is connected to the upright 15 pivotally connected to the main plate 4 on the pivot 17, the upright 15 having an arm 16 supporting a weight 16<sup>a</sup> which tends to move the aforesaid upright to the left as seen in Fig. 1. The said feed rod 18 may be secured in position in any one of the openings 15<sup>a</sup> in upright 15, that opening being used which places it in better position for the particular work being done. And the feed rod is made detachable as shown in Fig. 12 and has its end of anvil shape with a peculiarly shaped recess 18<sup>a</sup> which is of the shape to which it is desired to swage the saw teeth. By removing the cotter 18<sup>b</sup>, the feed rod 18 may be removed in order that another arm, with a different shape of recess 18<sup>a</sup>, may be substituted. To give movement to feed rod 18 to automatically feed the saw, tooth by tooth, I connect upright 15 with a cam lever 8, pivoted at 8<sup>a</sup>, by means of an adjusting rod 10 which passes through a support 12 con-



nected to the upright 15 by means of pivots  
 11 and the support 12 may thus move as  
 occasion requires. A rod 10 is also adjust-  
 able by means of a thumb nut 13 and the  
 5 feed rod 18 may be moved so that its slotted  
 end will be in the proper position to be  
 used as an anvil in swaging the saw teeth.  
 To give vertical adjustment to the anvil end  
 of rod 18, I support this anvil end upon  
 10 the clamps 19<sup>a</sup> and 19<sup>b</sup> (see Figs. 1 and 3)  
 and I employ a wedge 21 under the clamp 19<sup>b</sup>  
 and by driving this wedge to the left as  
 shown in Fig. 1 the clamp 19<sup>b</sup> may be slightly  
 elevated, the slot through which the bolt 20  
 15 projects, permitting this movement. Similar  
 movements may be given to the clamp 19<sup>a</sup>  
 by means of the adjusting screw 19<sup>x</sup> shown  
 in Fig. 3.

The cam lever 8 which has been referred  
 20 to as being connected to the rod 10 and piv-  
 otally supported at the point 8<sup>a</sup>, is provided  
 with a cam roller 9 which engages the cam  
 32 secured to the main shaft 30 as clearly  
 seen in Fig. 3, this cam being also shown in  
 25 Figs. 1 and 2. The cam is so formed that  
 when the parts are in the position shown in  
 Fig. 1 the roller 9 is at the outward move-  
 ment of its stroke thus holding the bar 15 in  
 the upright position shown in Fig. 1. But  
 30 at the time when the shaft 30 moves the cam  
 32 so that the cam roller 9 is permitted to  
 slide inwardly, the weight 16<sup>a</sup> on the arm 16  
 of the upright 15 moves said upright on the  
 pivot 17 to the left in Fig. 1 which causes  
 35 the feed rod 18 to also be moved to the left  
 thus bringing its anvil shaped end over the  
 point of the next tooth of the saw. When  
 during the operation of the machine, the  
 cam roller 9 is again forced outwardly as  
 40 the cam rolls under it, the cam lever is again  
 moved to the position shown in Fig. 1 thus  
 directing the upright 15, through the rod 10,  
 to the upright position and causing the feed  
 rod 18 to shove the next tooth of the saw  
 45 into position to be swaged.

Having described the various parts of the  
 machine, the manner in which the saw is  
 clamped in position and the way it is fed  
 tooth by tooth, I will now describe the head  
 50 for swaging the teeth. This swaging head  
 is shown in position on the machine in Figs.  
 1 and 3 and is shown in detail in Figs. 9  
 and 10 and the swaging elements are shown  
 in Fig. 8. On the end of the main shaft 30  
 55 is secured a ring or barrel 31, and to this  
 barrel or drum 31 are secured the side plates  
 29 which are curved inwardly toward each  
 other as shown particularly in Fig. 9 for the  
 purpose of retaining the ball *c* in position.  
 60 It will be understood that there are three  
 rollers *a*, *b* and *d* which are journaled in  
 the plates 29 and a ball *c* which is simply re-  
 tained in position by the inwardly curved  
 parts of said plates 29. These rollers act  
 65 progressively on each tooth, roller *a* swaging

it first slightly, roller *b* increasing the work,  
 ball *c* still further swaging the tooth and  
 then the specially formed roller *d* swages the  
 tooth to the exact shape desired. It is de-  
 sirable that these rollers shall not be fixedly  
 70 secured to the shaft 30 but shall have a  
 yielding connection therewith and I accom-  
 plish this by connecting the plates 29 to the  
 ring or barrel 31 in such a manner that they  
 may turn thereon. But in order to get the  
 75 best results a spring is employed to normally  
 hold these parts in the proper position for  
 work. This spring is located around the  
 reduced end of the shaft 30, see Figs. 9 and  
 10, and is held in position by means of a  
 80 plate 43 which is secured in place by means  
 of the thumb screw 42. The spring is desig-  
 nated 45 and has one end connected to a stud  
 or pin 44 projecting from one of the plates  
 29 and the other end is connected with a  
 85 stud or pin 46 projecting from the shaft 30  
 alongside of its reduced end. The drum or  
 barrel 31 has two cut-away portions 31<sup>a</sup>, as  
 illustrated in dotted lines in Fig. 10, and  
 two pins or screws designated by the numer-  
 90 als 47 work within these cut-away portions  
 and limit the movement of the plates 29 on  
 the shaft 30. It follows from this that dur-  
 ing the rotation of shaft 30 the first roller *a*  
 95 is brought into contact with the tooth of the  
 saw which is being swaged and instead of  
 striking the tooth and performing its work  
 immediately, the spring 44 permits the plates  
 29 holding the roller to have a retarded ac-  
 100 tion while the shaft continues to rotate, this  
 action continuing for the length of the cut-  
 away portions 31<sup>a</sup> just referred to. Shaft 30  
 continues to rotate and when the pins come  
 to the ends of the slots the roller performs  
 its work of rolling over the tooth, after  
 105 which the spring will tend to unwind caus-  
 ing the plates 29 to have a suddenly acceler-  
 ated movement bringing the next roller up  
 to the tooth being swaged, when the opera-  
 tion is repeated for each of the following  
 110 swaging devices *b*, *c* and *d*.

Although I have to some slight extent set  
 forth the operation of the various parts of  
 my invention in describing the various fea-  
 115 tures, it may yet be best to describe the opera-  
 tion in detail. The operator first turns the  
 locking handles 34 and releases the face  
 plate 33 so that he may move this slightly  
 horizontally and then lower it vertically un-  
 til it and its connected clamp 19<sup>a</sup> is removed  
 120 from the machine. Assuming that it is nec-  
 essary to swage the tooth of a band saw, the  
 operator then places the band saw upon the  
 supports 5<sup>c</sup>, as illustrated in Fig. 3, and  
 turns the buttons 5<sup>b</sup> to the positions shown  
 125 in Fig. 1. If the machine has not been ad-  
 justed for this particular size of saw, the  
 carrier 5 may now be vertically adjusted by  
 hooking the pin 6<sup>a</sup> in the appropriate slot  
 130 25<sup>a</sup>, and fine adjustment may be made by



means of the crank handle 28 so that the saw is raised until the point of its teeth just touch the swaging rollers. The feed rod 18 may be adjusted for the proper length of feed according to the length of teeth by means of the adjusting holes 15<sup>a</sup> and by means of the thumb nut 13. The face plate may then be put back upon the machine and tightened in position by means of the handles 34. The machine is now ready for operation and the main shaft 30 is started in its rotation; and the rotation of the cam 35 brings its tail against the cam roller on the cam lever 24 and thereby moves the rod 24<sup>a</sup> to clamp the saw between the clamps 19<sup>a</sup> and 19<sup>b</sup>. Continuing rotation of the main shaft 30 then brings the rollers *a*, *b*, *c* and *d* successively into operation upon the saw tooth, which is during this rotation, supported upon the anvil-shaped end of the feed rod 18. After these rollers successively swage the tooth to the proper shape, the shaft 30 and its cams continue their rotation and at the point where the roller 9 of the cam lever 8 is permitted to drop off of its cam, the weight 16<sup>a</sup> draws the upright 15 and its feed bar 18 to the left in Fig. 1, thus causing the feed rod 18 to slip over the next successive tooth, the saw being in the meantime, still clamped by the clamps 19<sup>a</sup> and 19<sup>b</sup> so that the anvil-shaped end of the feed bar 18 may easily be pushed away from the tooth without pulling the saw tooth with it. The continuous rotation of the shaft 35 causes the companion cam 35 to drop its cam roller so that the lever 24 may move to the left as shown in Fig. 2, thus permitting the clamp 19<sup>b</sup> to move slightly to the left and release the saw from between the clamps 19<sup>a</sup> and 19<sup>b</sup>. The further movement of the shaft 30 now brings the cam 32 to the point where it causes the cam roller 9 to move up to the highest point of the cam, thus causing the cam lever 8 to move the rod 10 (see Fig. 1) and acting on the upright 15 through the rod 10 causing the feed arm 18 to move the next saw tooth in position under the swaging head, it being understood that the saw is now free since the clamps were released. By the time this has been accomplished, the tail of the cam 35 rides against its cam roller and this roller with its cam lever 24 is moved to give lateral movement to the saw clamp 19<sup>b</sup> so that the saw will be again clamped on the anvil-shaped end of the feed arm 18 ready for the swaging action of the rollers *a*, *b*, *c* and *d*. It will, of course, be understood that this operation is repeated for each tooth of the saw until all the teeth are properly swaged, when the face plate 33 may be unlocked from position and removed from the machine, the saw moved and a new saw placed in position.

It will be understood that my invention is

shown in its preferable embodiment and that changes and modifications may be made without departing from the spirit of my invention, the scope of which may be seen from the appended claims.

What I claim as new is:

1. In a swaging machine, a swaging head, a rolling swaging device and means supported by said head for carrying said swaging device, said means and said device having a slight circumferential movement independent of said head as the latter operates.
2. In a swaging machine, a swaging head, a rolling swaging device, means supported by said head for carrying said swaging device, said means and said device having a slight circumferential movement independent of said head as the latter operates, and a spring normally holding said head and said swaging device in operative position and arranged to permit said slight circumferential movement.
3. In a swaging machine, a swaging head, a plurality of swaging rolls and means supported by said head for carrying said swaging rolls, said rolls having graduated circular surfaces, said means and said rolls having a slight circumferential movement independent of said head as the latter rotates, and a spring connecting said head and said supporting means whereby said supporting means and its rolls are given an accelerated movement after each of said rolls performs its work.
4. In a swaging machine, a swaging head, swaging means carried thereby, and side plates for holding said swaging means in position, said side plates and said swaging means having a slight circumferential movement independent of said head as the latter operates.
5. In a swaging machine, a swaging head, a swaging ball carried by said head, plates having portions underturned to retain said ball in position, and said plates and said ball having limited circumferential movement independent of said swaging head as the latter operates.
6. In a swaging machine, the combination of a tool-supporting device, a swaging head in working proximity thereto, rolling swaging devices and means supported by said head for carrying said swaging devices, said means and said swaging devices successively having limited circumferential movement with respect to said head whereby as they successively roll against the tool, the swaging devices are permitted to successively lag behind the head and then roll over the tool.
7. In a swaging machine, the combination of a rotary swaging head, rolling swaging means and means supported by said head for carrying said swaging devices, said



means and said swaging means having limited circumferential movement with respect to said head whereby as they roll against the tool, the swaging means are permitted to lag behind the head and then roll over the tool, and a spring cooperating with said means to cause the swaging means to have accelerated movement in the direction of the rotation of the head immediately after swaging the tool.

8. In a swaging machine, a swaging head comprising rolling swaging means and means for holding the same in position, and a spring coacting with the head proper and with the means for holding the swaging means, said spring permitting the holding means and swaging means to have movement independent of the head proper as the swaging means roll against the tool.

9. In a swaging machine, the combination of a swaging head carrying a swaging member, a shaft carrying said head, a tool clamping member, a clamping member, and a cam operated by said shaft for periodically operating one of said clamping members.

10. In a swaging machine, an adjustable tool support comprising a vertically movable support and an adjusting device for raising and lowering said support, said device comprising a bar having hooks and coacting elements on one side for rapid adjustment and a threaded member and coacting element on the other side for slow adjustment.

11. In a swaging machine, a support for the tool having vertical adjustment with relation to the frame of the machine, a horizontal support under said tool support, a bar having hooks and coacting elements at one side of said horizontal support for rapid adjustment thereof, a stirrup at the other end of said horizontal support, and a threaded rod and coacting element for deli-

cate adjustment of said stirrup and said horizontal support.

12. In a swaging machine, the combination of a swaging head, a pair of clamping jaws arranged to clamp the saw from opposite sides in working relation to said head, one of said jaws being supported by the main frame of the machine, a face plate carrying the other jaw and having open ended slots, and means supported by the main frame coacting with said slots to secure said face plate and whereby said face plate and its clamping jaw may be removed to place another saw in working relation to said working head.

13. In a swaging machine, the combination of a swaging head, a pair of clamping jaws arranged to clamp the saw from opposite sides in working relation to said head, one of said jaws being supported by the main frame of the machine, a face plate carrying the other jaw and having an open ended slot through which part of the swaging head projects and open ended securing slots, and means supported by the main frame coacting with said securing slots to secure said face plate, the several slots permitting the face plate and its clamping jaw to be removed to place another saw in working relation to said working head.

14. In a swaging machine, the combination of a swaging device, and a feed rod coacting therewith having a recess contracted at its mouth and enlarged inwardly, the said recess determining the depth to which the tooth is to be swaged.

Signed by me at Providence, Rhode Island, this 30th day of July, 1907.

WILLIAM LANDON COVEL.

Witnesses:

CHARLES M. PIKE,  
WM. J. BRAITSCHE.