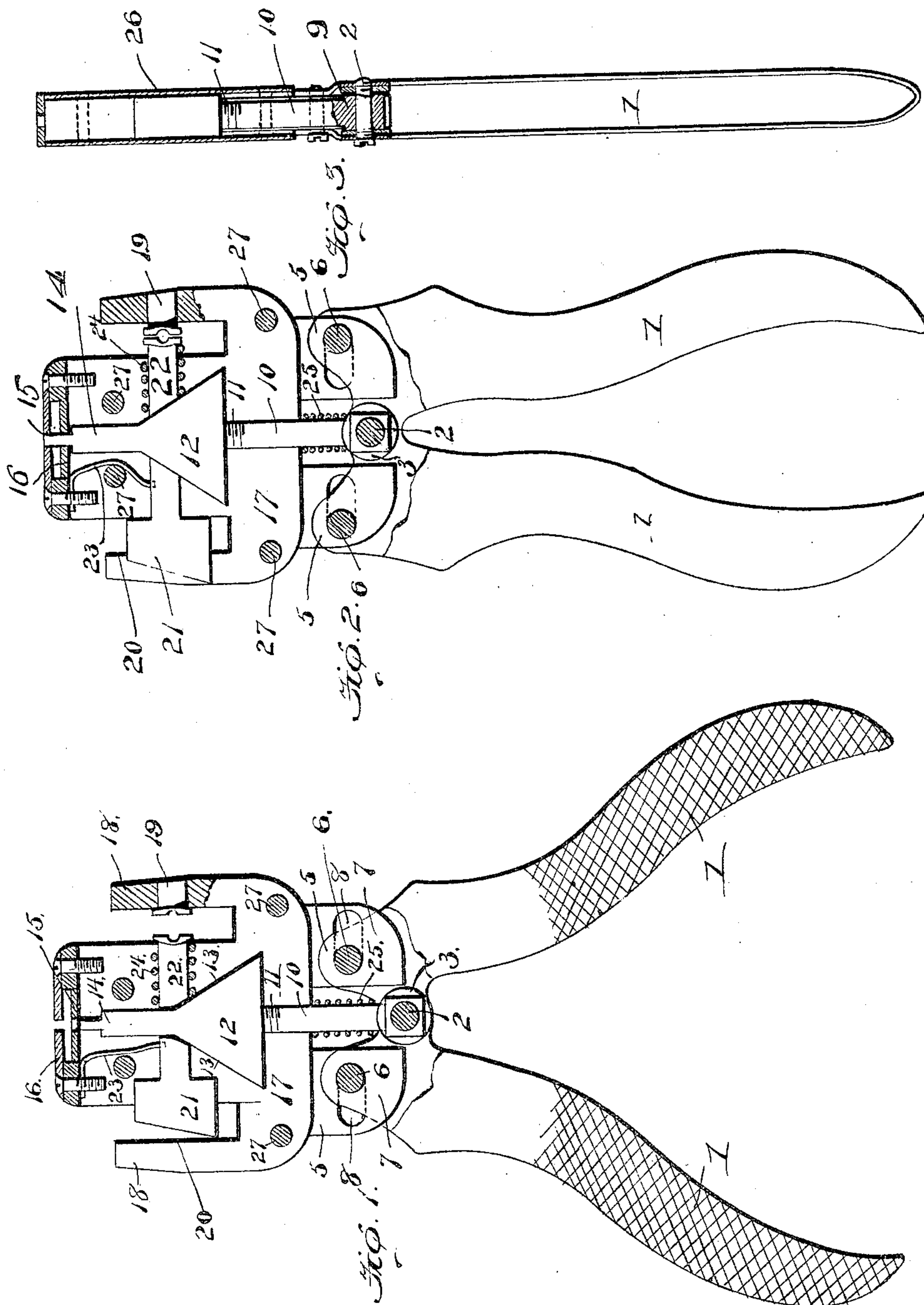


No. 804,295.

PATENTED NOV. 14, 1905.

E. M. ZACHARIAS.
HAND TOOL.
APPLICATION FILED MAR. 10, 1903.

4 SHEETS—SHEET 1.



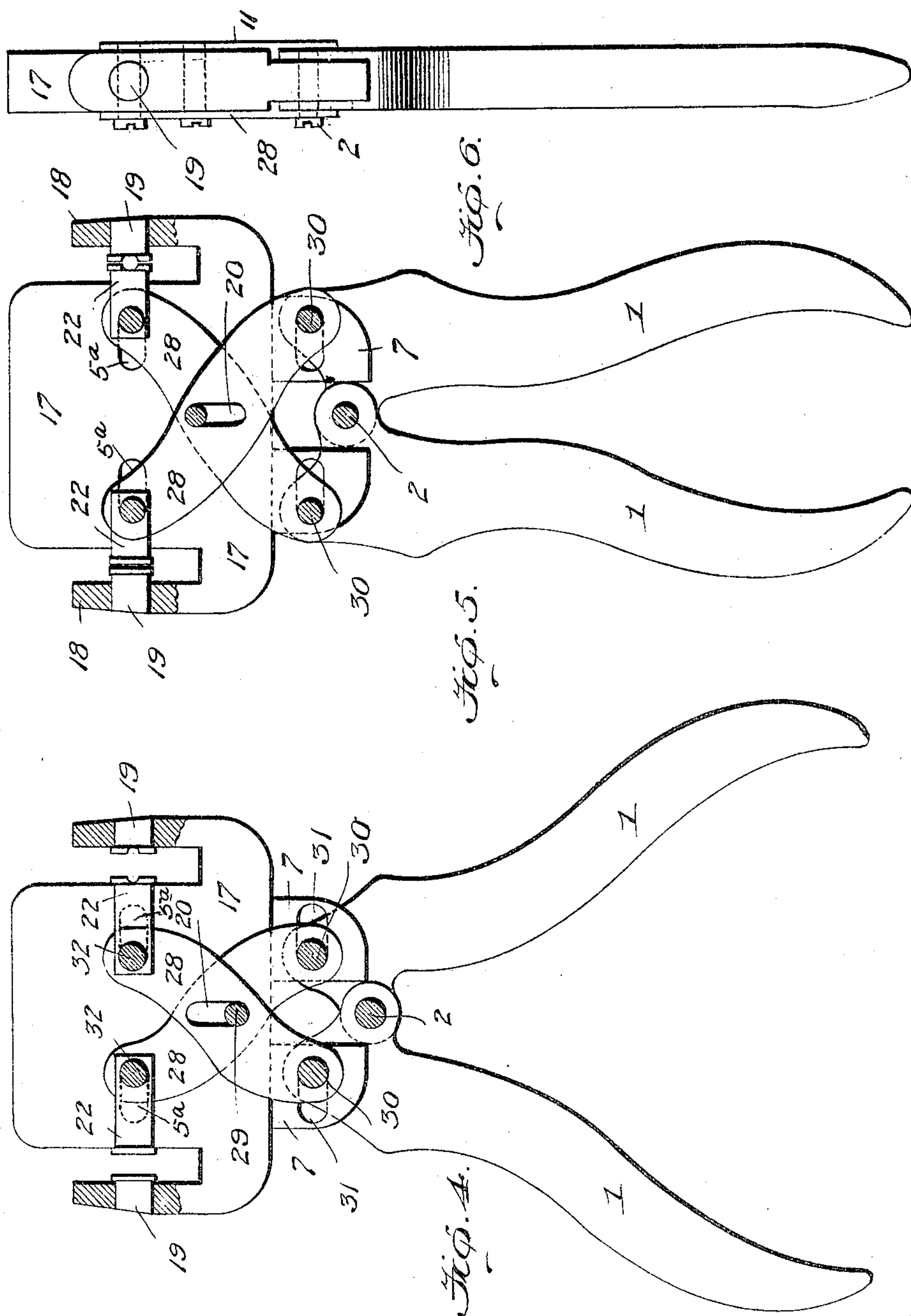
Witnesses
John J. Nelligan.

Inventor
Edward M. Zacharias.

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HAND TOOL.

APPLICATION FILED MAR. 10, 1903.

4 SHEETS—SHEET 2.



Witnesses

J. J. Melligan.

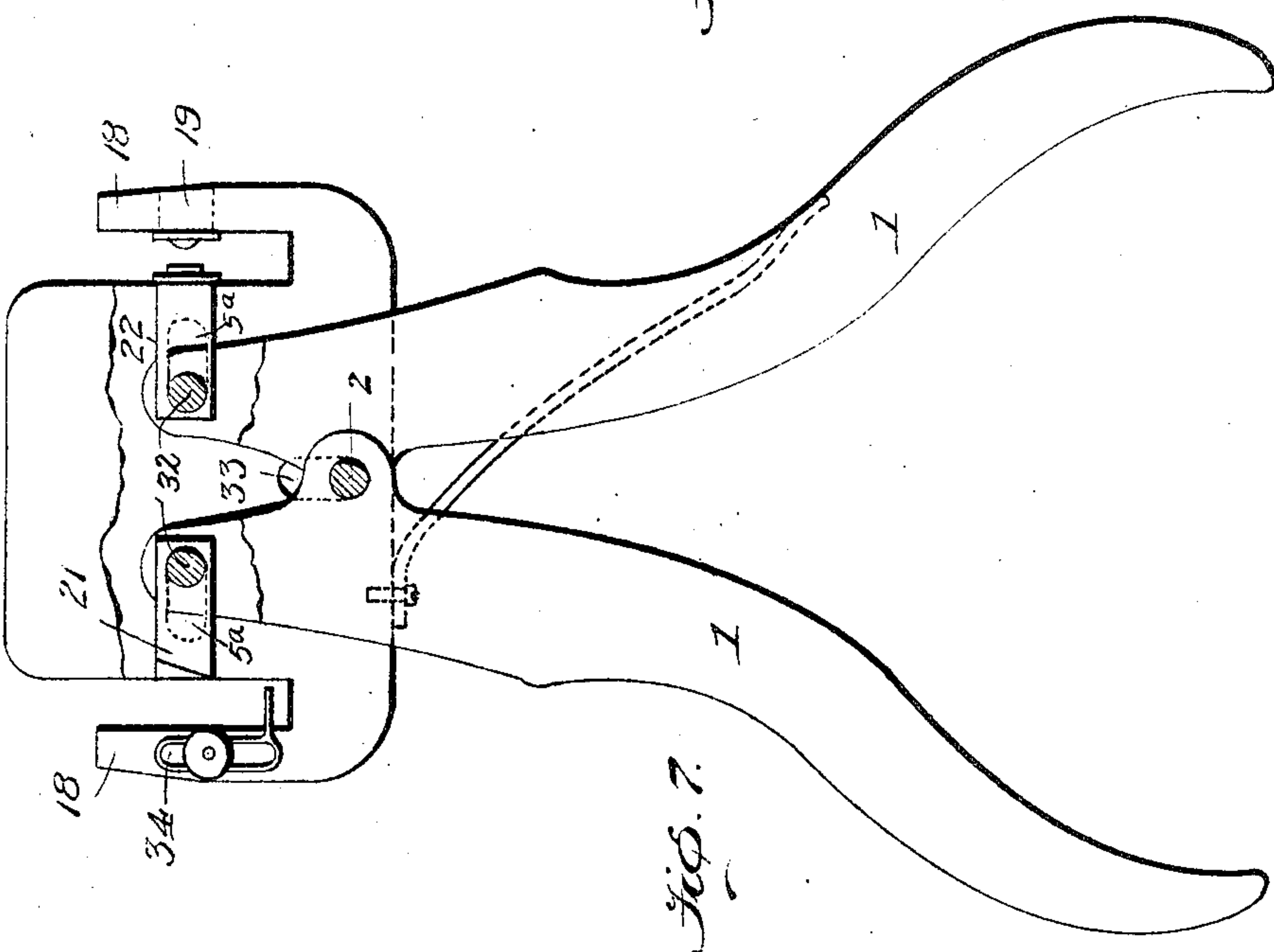
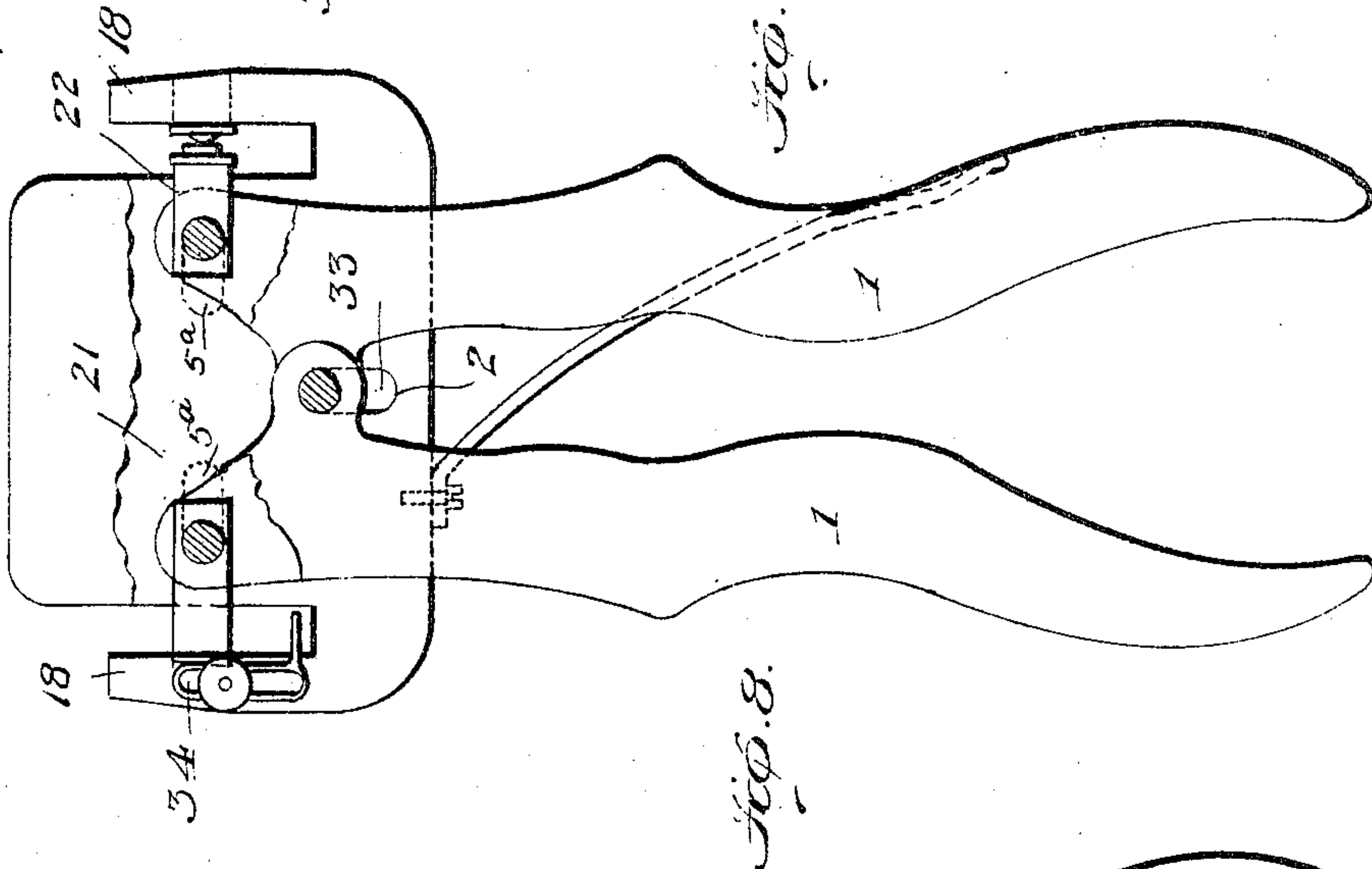
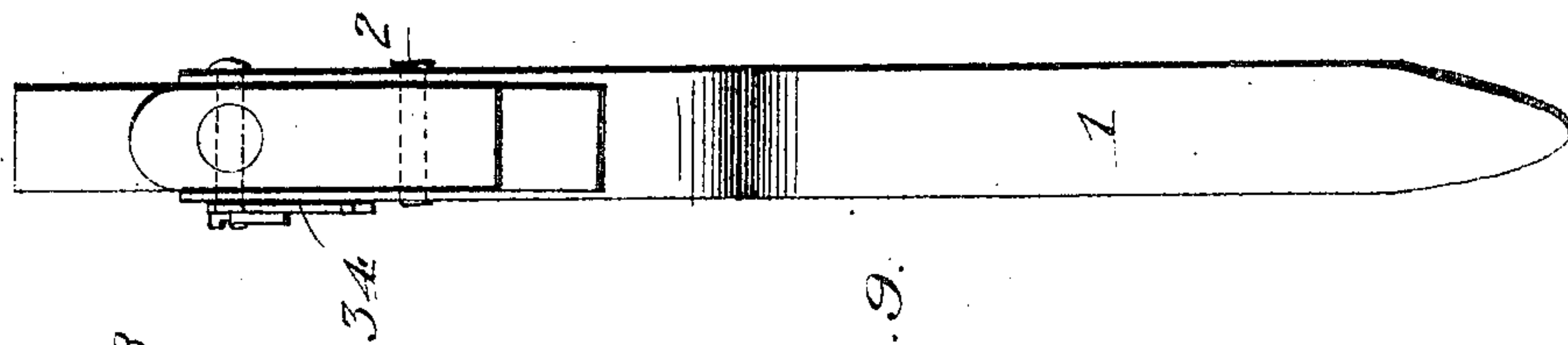
Inventor

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HAND TOOL.

APPLICATION FILED MAR. 10, 1903.

4 SHEETS—SHEET 3.



Witnesses

J. Mulligan

Inventor

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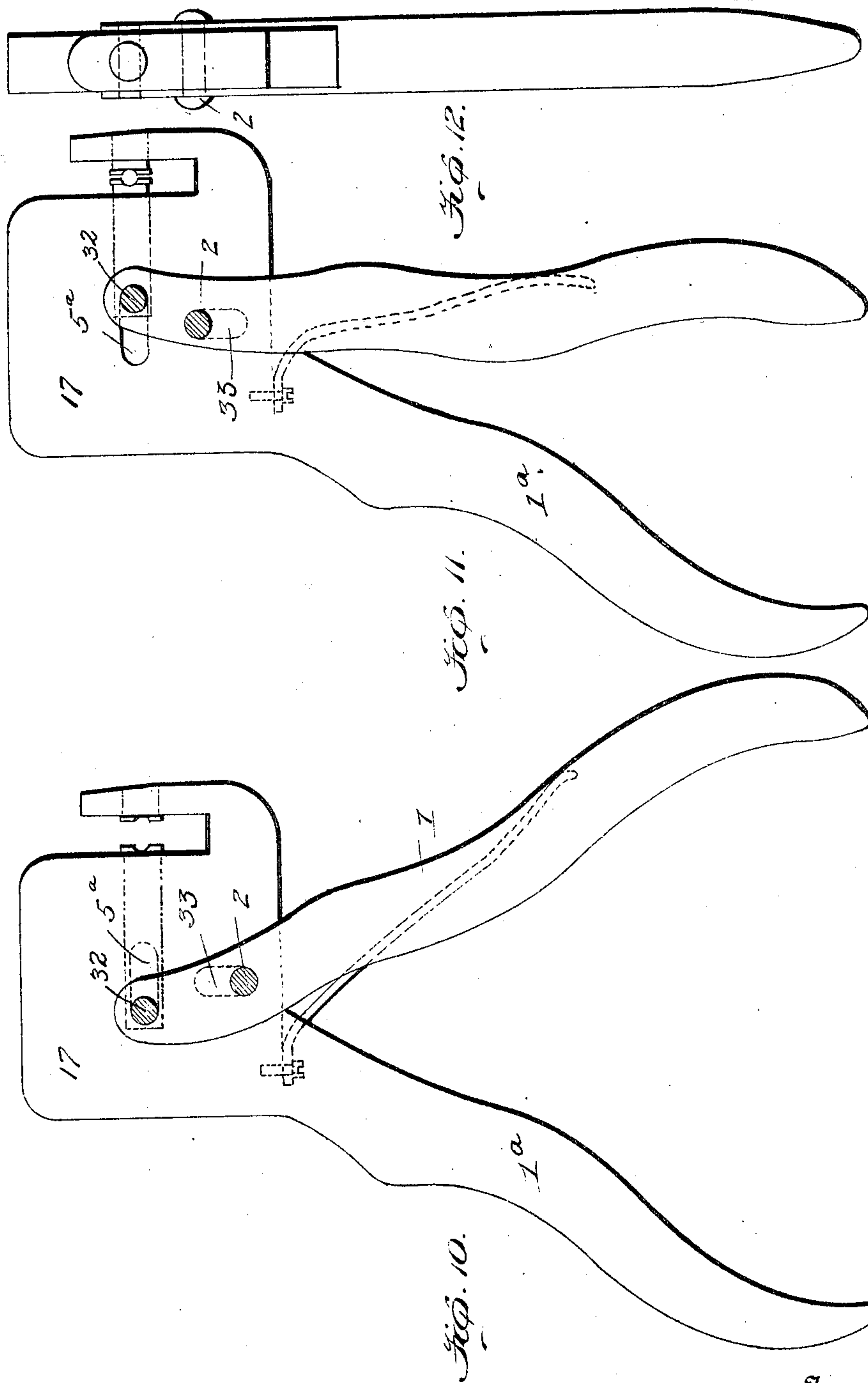
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4 SHEETS—SHEET 4.



Witnesses

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UNITED STATES PATENT OFFICE.

EDWARD M. ZACHARIAS, OF NEW YORK, N. Y.

HAND-TOOL.

No. 804,295.

Specification of Letters Patent.

Patented Nov. 14, 1905.

Application filed March 10, 1903. Serial No. 147,095.

To all whom it may concern:

Be it known that I, EDWARD M. ZACHARIAS, a citizen of the United States, and a resident of the borough of Brooklyn, city and State of New York, have invented certain new and useful Improvements in Hand-Tools, of which the following is a specification.

My invention relates to hand-tools designed for the purpose of cutting, punching, eyeletting, or riveting sheet materials; and the object of the same is to provide a tool which shall be simple in construction, efficient in operation, and which shall be strong, durable, and of great power.

It has been the custom of previous inventors and manufacturers in making punches to design them in plier form—that is, mounting the cutters or punches on the jaws of the pliers—which not only necessitates the tool having a great deal of lost motion between the various joints, especially in the compound-lever type, but also entails an expense of having two or more moving jaws, which I obviate in my construction.

The accompanying drawings, which form part of this specification, show that all the cutters and punches operate parallel and that I only use a single stationary head or tool-carrier connected direct to the levers or its equivalents. They also show that I use the weight arm and fulcrum in all forms of tools to accomplish the desired result.

Figure 1 shows a side view and partial section of a compound tool, showing a piercing-punch, a shear, and a rivet-upsetter all mounted in a single stationary head. Fig. 2 is a similar view of the tool, showing the handles closed. Fig. 3 is a sectional edge view of the same. Fig. 4 is a side view and partial section of a tool slightly modified, showing how I may use secondary levers connected to the primaries to increase the power, if desired. Fig. 5 is a similar view of the tool, showing the handles closed. Fig. 6 is an edge view of the same tool. Fig. 7 is a side view and partial section of a simpler form of a tool, showing how the levers may be connected direct to the operative tools. Fig. 8 is a similar view of the tool with the handles closed. Fig. 9 is an edge view of the same. Fig. 10 is the simplest form of my invention, showing how I may dispense with one lever, making the necessary hand-support integral with the tool-head. Fig. 11 is a similar view showing the handle closed. Fig. 12 is an edge view of same.

Like numerals of reference designate like

parts where they occur in the different views of the drawings.

Referring now to Figs. 1, 2, and 3, the numeral 1 designates the handles or primary levers of the tool. These handles may be pressed up from sheet metal to form a substantially U-shaped handle, as shown in the edge-view section. At the upper ends of the handles are offsets or lugs 3, through which a pivot pin or screw 2 passes and serves as the weight-arm of the levers, which always travel upward as the tool is closed. The upper ends 5, which act as the fulcrum, are provided with holes through which a screw 6 passes, which in turn move in the slots 8 in the extensions 7 of the solid head 17. These slots 8 being in a horizontal position insures a true vertical movement of the weight-arm. The pin or screw 2 is passed through the holes in weight-arm and hub 9 on the shank 10, which extends up into the head of the tool and is screw-threaded at 11 to serve as means for holding and adjusting a cam and punch 12, said cam having inclined sides 13, an extension 14, and a punch 15. The upper end of the head is provided with a guideway 16, into which the material to be punched is fed. The head 17 of the tool is cut out so as to form two extensions or horns 18, which may be provided with an anvil 19 and a shear edge 20 or any other tool to operate in conjunction with cutter 21, an upsetter 22 being connected to the head upon the opposite side from the cutter, as shown in Figs. 1 and 2. A spring 23 is secured at one end to the head and having its opposite end engaging an aperture in the cutter 21, which serves to return the cutter 21 to its inoperative position after each operation of the tool, and a spiral compression-spring 25 serves to return the cam 12 to its original position after each operation of the tool. It will be understood that a plate or cover 26 incloses the operative parts of the tool, as shown in Fig. 3, this plate or cover being secured by means of screws or pins 27. This tool is shown to illustrate that I may use a number of operative tools, such as punches, cutters, anvils, upsetters, or any other which may be desired.

In Figs. 4 to 12, inclusive, I show the simplest, cheapest, and most powerful parallel-moving hand-punch which may be manufactured.

Referring now to Figs. 4, 5, and 6, it will be seen that the handles or primary levers 1 are of substantially the same construction as those

shown in the preceding figures; but in this form I dispense with the inclined cam 12 and substitute secondary levers 28, which are connected to the ends of handles 1 at their lowest extremities, pivoted in the center and connected at the upper extremities by means of rivets or screws to the upsetters 22, which in turn move in horizontal holes or guides drilled in the solid head 17. It will be clearly seen that this is a simple form of toggle leverage, which is the most powerful leverage obtainable in modern mechanics. It will also be seen that I may shift the pivotal point of the secondary levers as to obtain any desired power.

Fig. 5 shows when the tool is closed the ends 30 of levers 1 move in a horizontal direction from right to left on the one side and from left to right on the other side, transmitting motion to the secondary levers, which in turn travel opposite to the ends 30 of levers 1, respectively, transmitting the same motion to the punches.

In Figs. 7, 8, and 9 I show a form still more modified; but, as will be clearly seen, I use the same principle involved in the preceding forms—*i. e.*, I use a single solid head with horizontal and vertical moving fulcrums. In this case the punches 21 and upsetter 22 are pivoted direct to the levers, the fulcrum sliding in a vertical slot 33 in the solid head insuring a horizontal movement of the punch, which in turn also slides in a guide drilled in the solid head.

Figs. 10, 11, and 12 show how I may dispense with either of the primary levers by making the support for the hand and the head in one piece. It will be clearly seen that I still retain the original principle and also show that I can pivot each handle independently of the other, which is impossible in any other form of hand-tool to my knowledge. From the foregoing it will be seen that owing to the manner in which I connect the handles and the fact of having only one solid head I not only obtain a very powerful tool, but also have a rigidity which cannot be obtained in any form of hand-tool now in

the market. It will also be seen that I can use any number of operative tools in combination with one another without sacrificing strength or power.

Having now described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A hand-tool comprising a head carrying operating-tools, a plurality of fulcrum-guideways in said head extending in angularly-related directions, an actuating-handle mounted on a plurality of fulcrums movable in said guideways, and means whereby one of said fulcrums is adapted to move all the operating-tools.

2. A hand-tool comprising a head carrying operating-tools, a plurality of fulcrum-guideways in said head extending in angularly-related directions and a plurality of handles, each handle being mounted on a plurality of fulcrums movable in said guideways.

3. A hand-tool comprising a head carrying a plurality of operating-tools, an actuating-handle mounted on a plurality of fulcrums movable in angularly-related directions, and means whereby one of said fulcrums is adapted to move all the operating-tools.

4. A hand-tool comprising a head carrying a plurality of operating-tools, an actuating-handle mounted on a plurality of fulcrums movable in angularly-related directions, and a cam actuated by one of said fulcrums for moving all the operating-tools.

5. A hand-tool comprising a head carrying a plurality of operating-tools, two actuating-handles, each handle mounted on a plurality of fulcrums guided to move in angularly-related directions, one of said fulcrums being common to the two handles, and a cam actuated by said fulcrum for moving all the operating-tools.

In testimony whereof I have signed my name to this specification in presence of two witnesses.

EDW. M. ZACHARIAS.

Witnesses:

JAMES H. WOOD,

CLEMENT F. KINGMAN.