

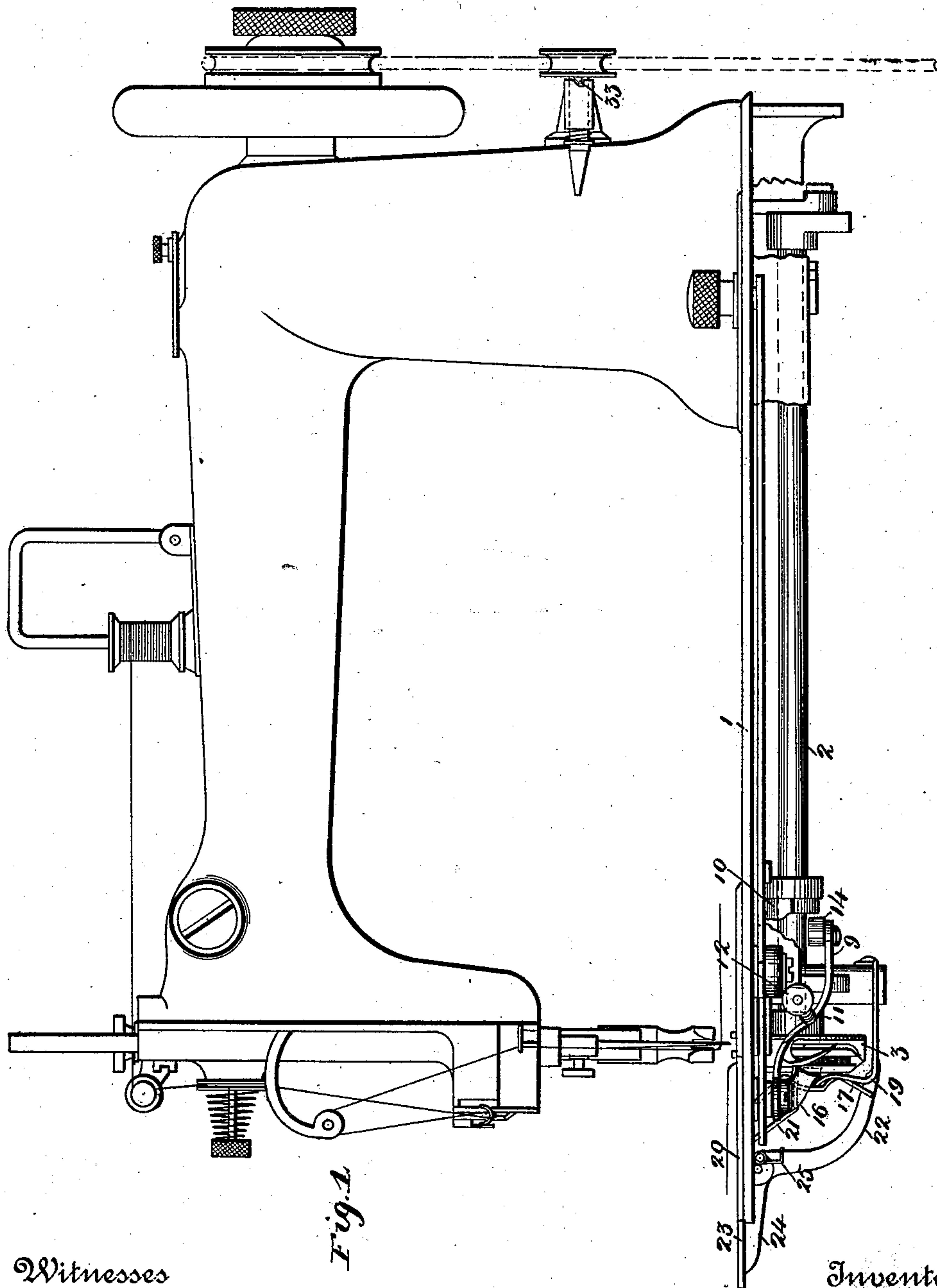
(No Model.)

3 Sheets—Sheet 1

A. D. SMITH.
SEWING MACHINE.

No. 548,894.

Patented Oct. 29, 1895.



Witnesses
J. J. Donohoe
J. P. Vastine

Inventor
Albert D. Smith
By his Attorneys
Keller & Storer

(No Model.)

3 Sheets—Sheet 2.

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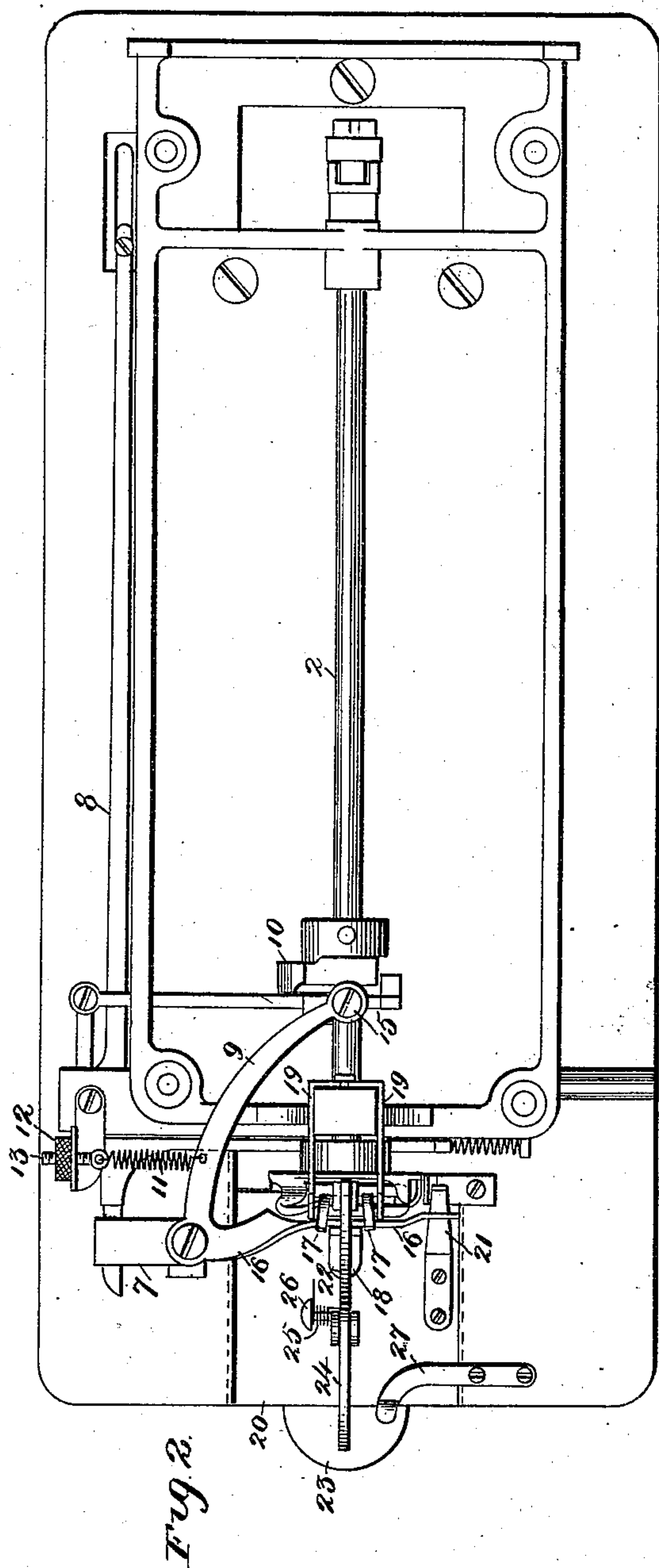


Fig. 4.

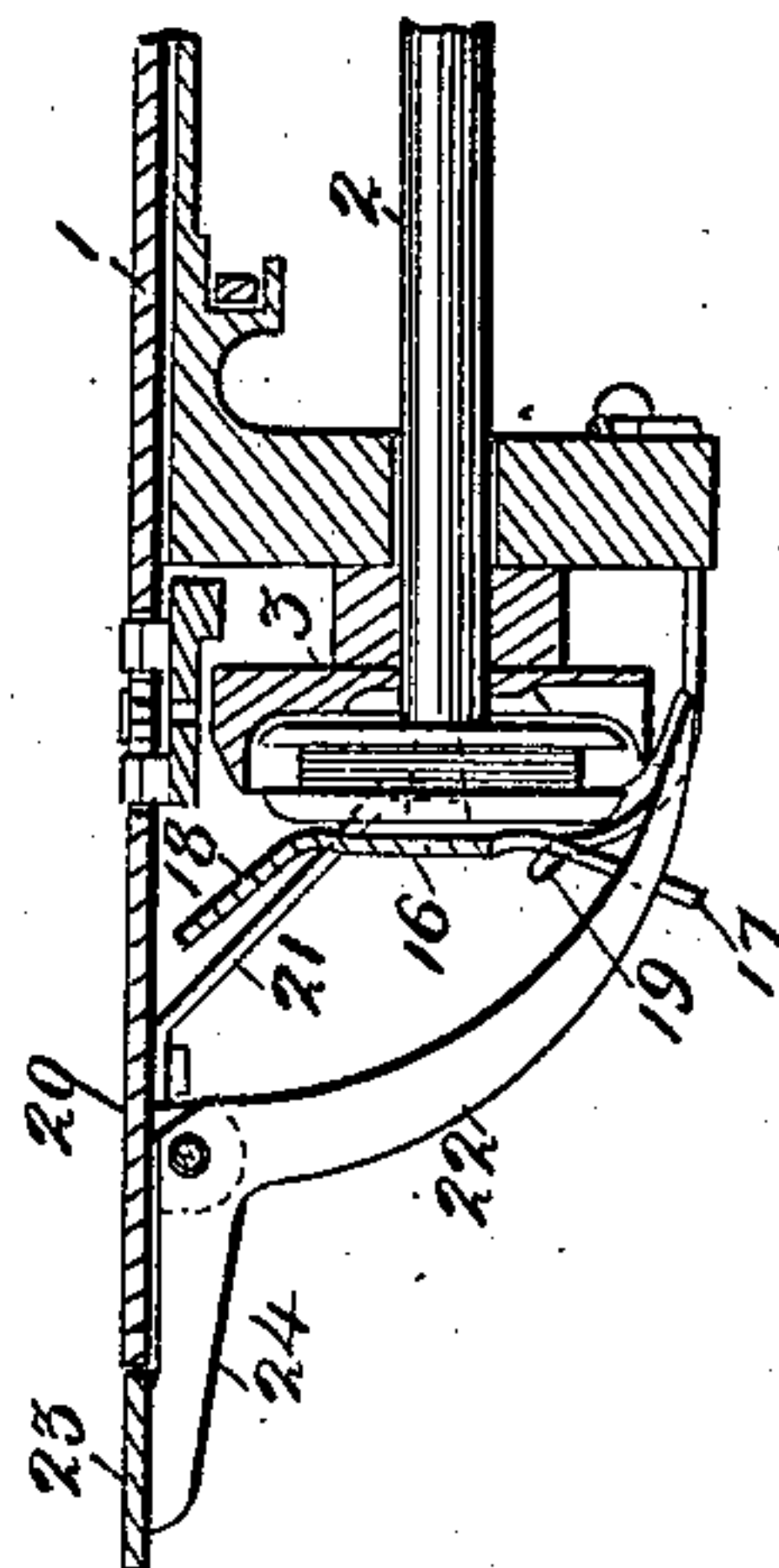
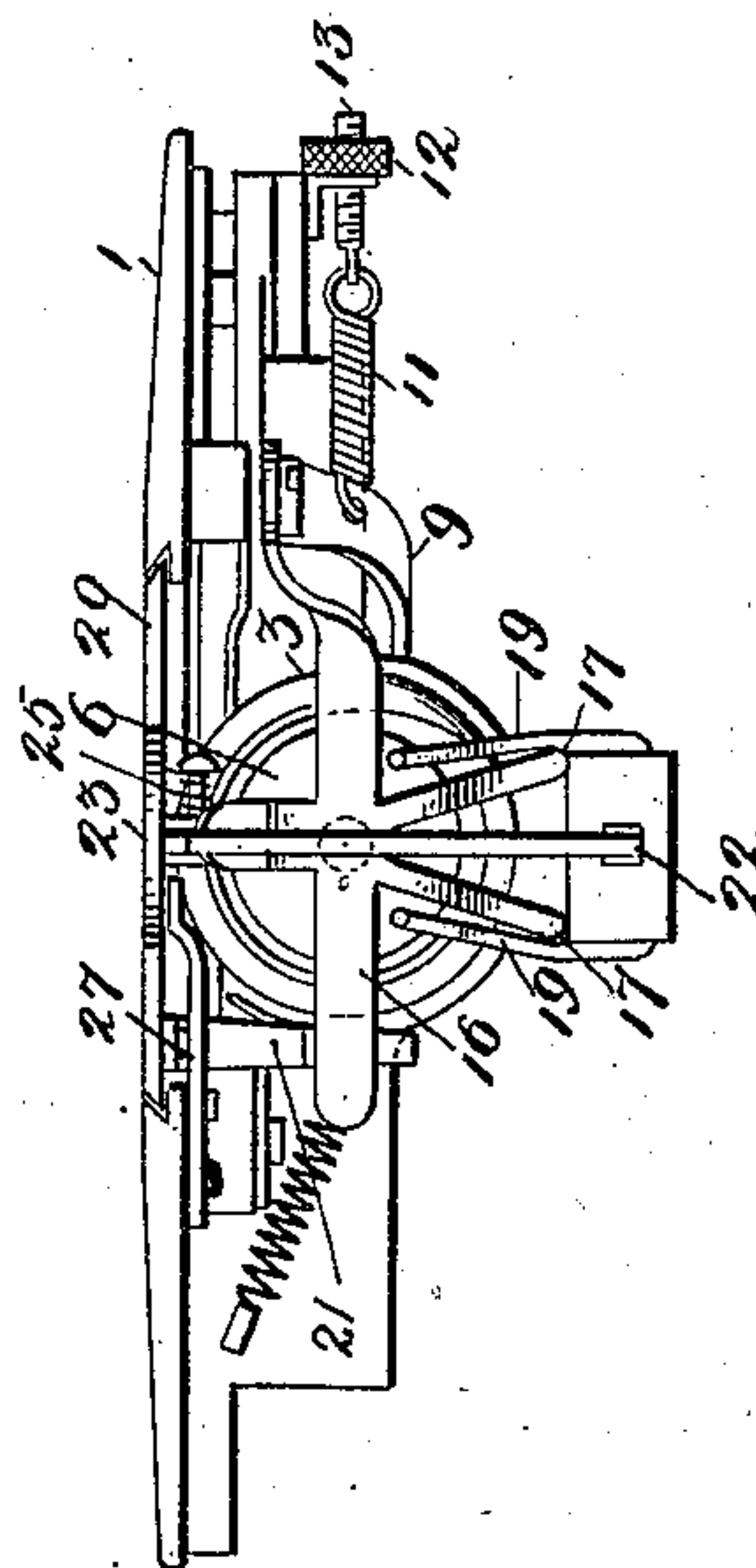


Fig. 5.



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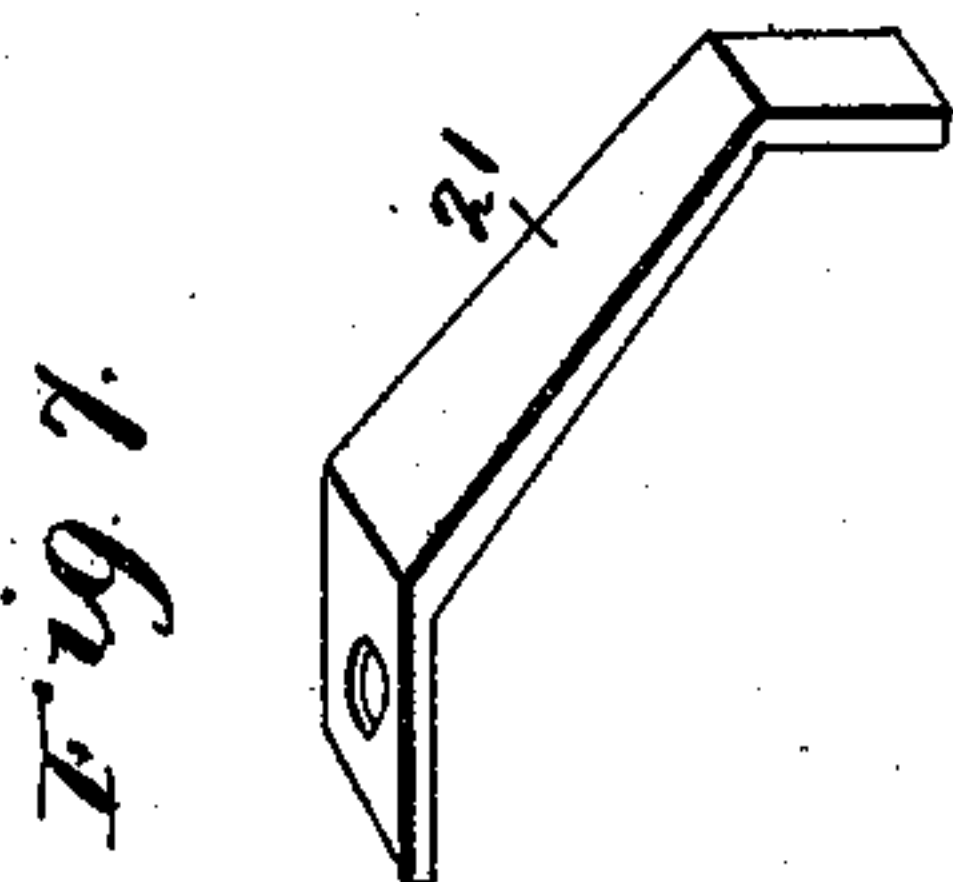
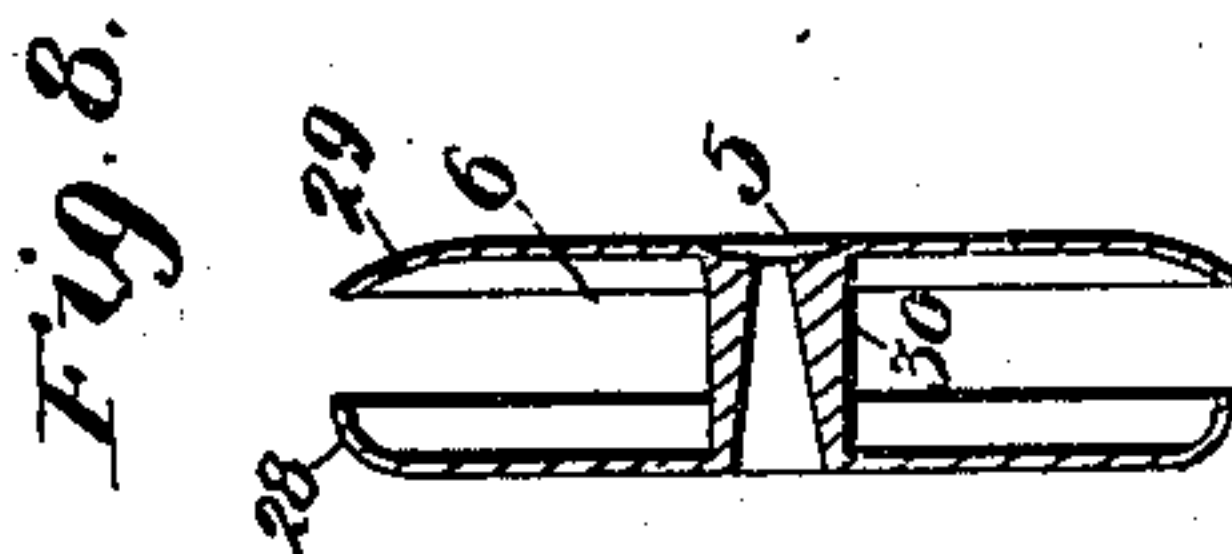
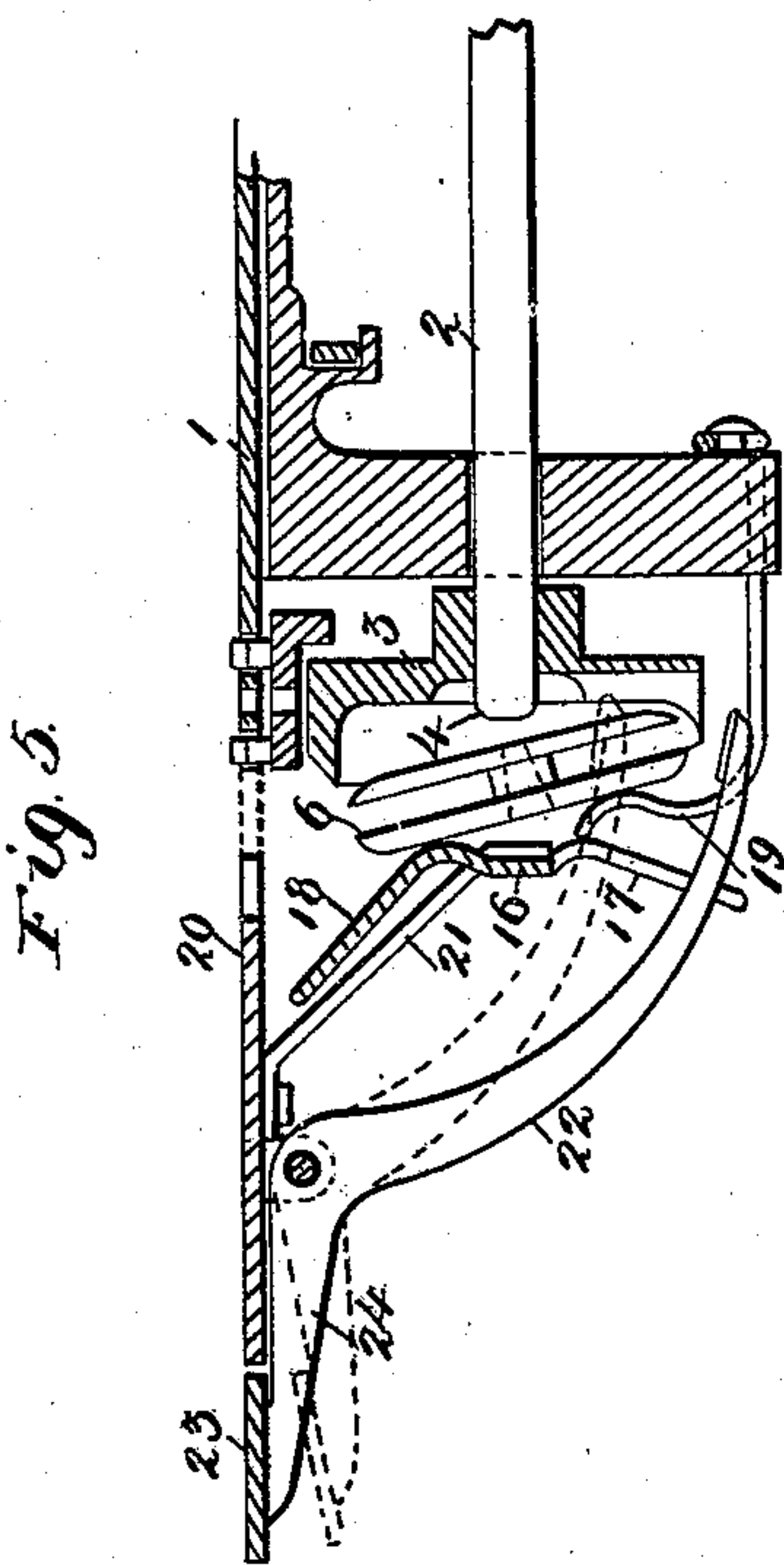
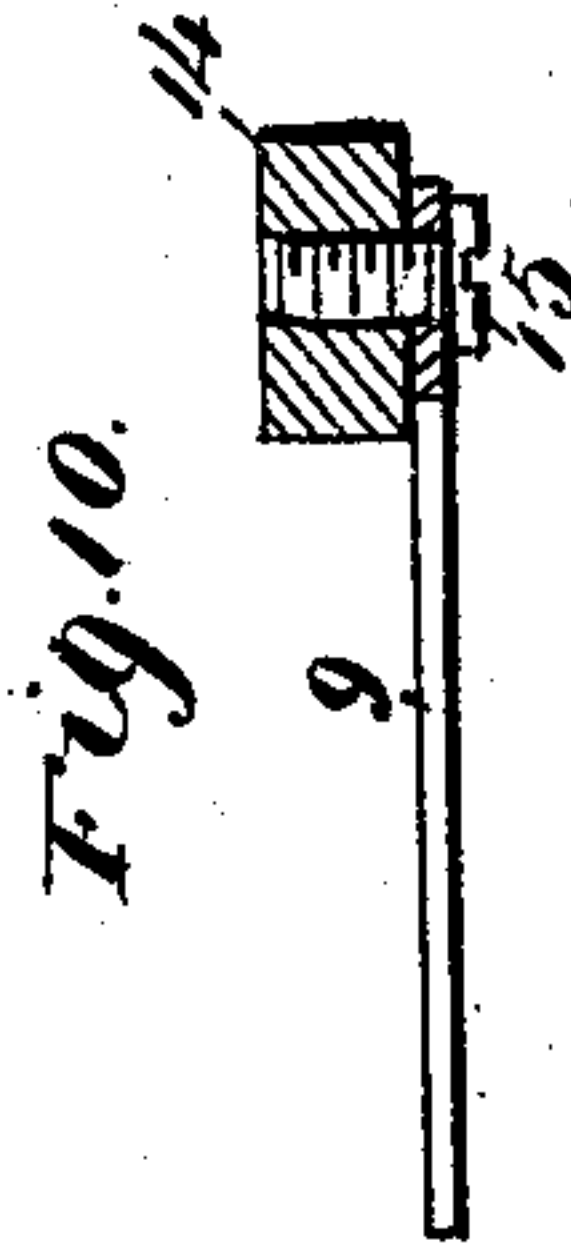
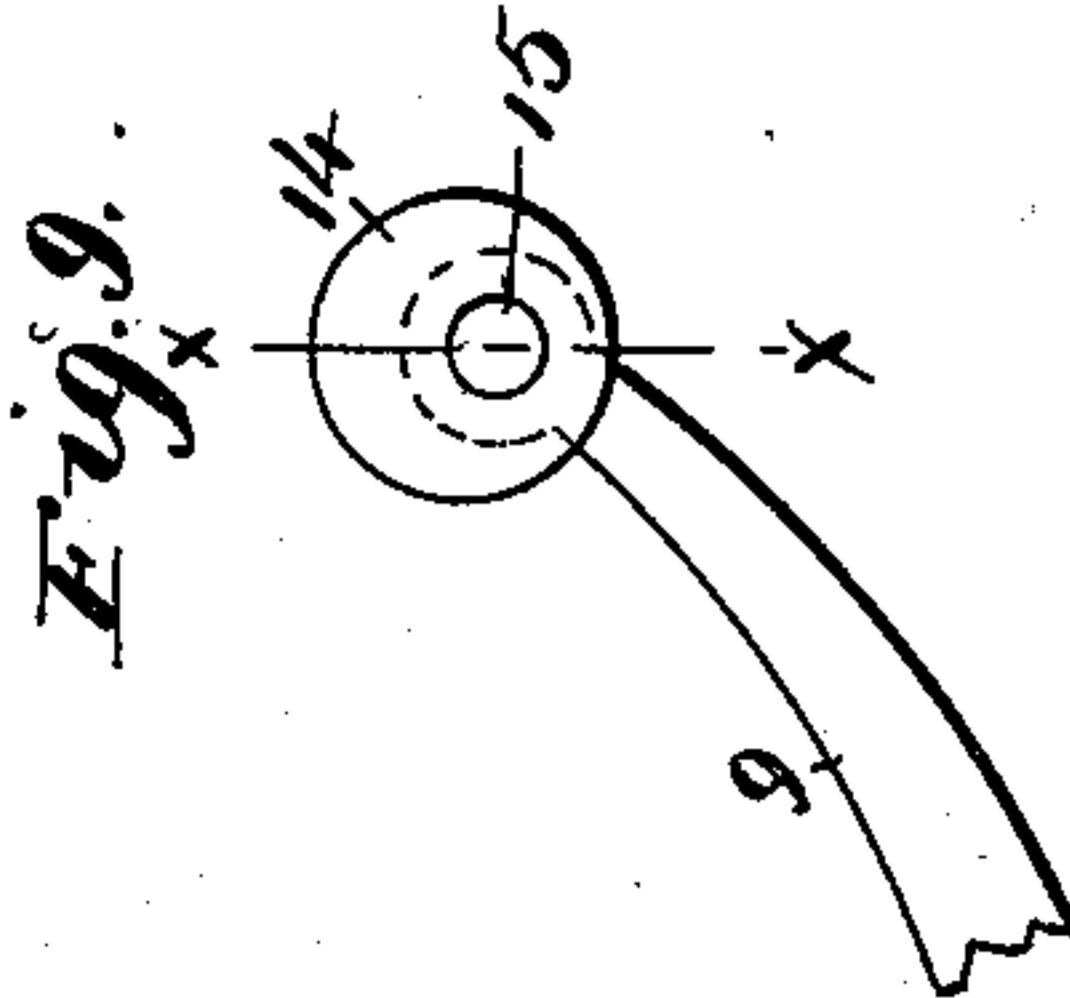
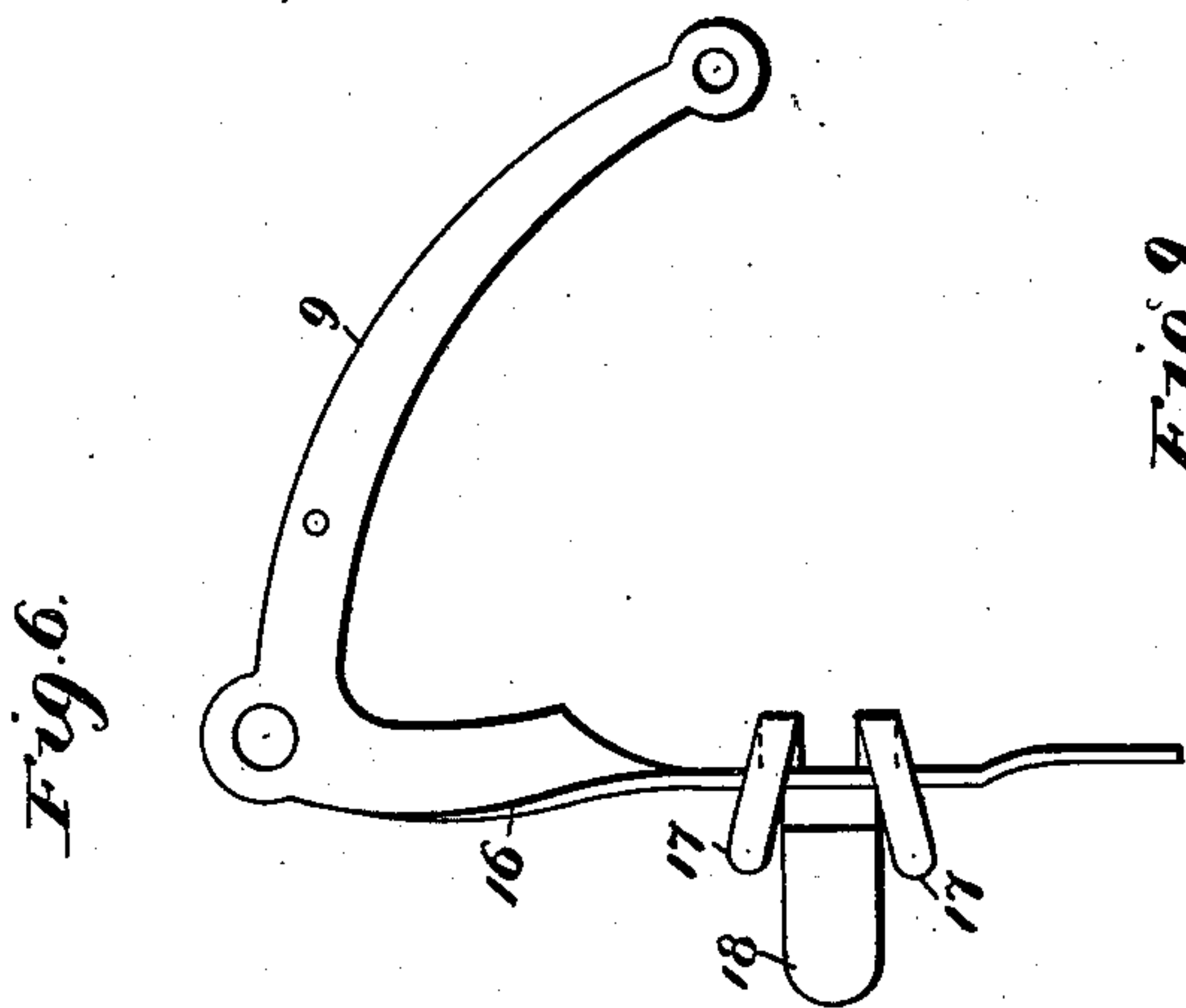
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UNITED STATES PATENT OFFICE.

ALBERT D. SMITH, OF ST. LOUIS, MISSOURI.

SEWING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 548,894, dated October 29, 1895.

Application filed July 19, 1894. Serial No. 517,961. (No model.)

To all whom it may concern:

Be it known that I, ALBERT D. SMITH, of the city of St. Louis, State of Missouri, have invented certain new and useful Improvements in Bobbin-Holders, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part hereof.

My invention has relation to improvements in bobbin-holders for sewing-machines; and it consists in the novel arrangement and combination of parts, more fully set forth in the specification, and pointed out in the claims.

In the drawings, Figure 1 is a side elevation of a top of a machine with my improved holder attached thereto. Fig. 2 is a bottom plan view of the bed-plate with my improvement attached. Fig. 3 is an end view. Fig. 4 is a vertical longitudinal section with parts in normal position. Fig. 5 is a similar section with parts in position for ejecting the bobbin. Fig. 6 is a plan view of the oscillating or yielding holder. Fig. 7 is a perspective view of the arm for retracting the holder from its engagement with the bobbin. Fig. 8 is a sectional view of the bobbin. Fig. 9 is a detail view of one end of one of the arms of the holder with its adjustable terminal cam secured thereto, and Fig. 10 is a section on *x x* of Fig. 9.

The object of my invention is to construct a bobbin-holder and tension-equalizer for that class of sewing-machines known as the "rotating-hook" type, or the partially-rotating type known as the "oscillating" type, the special purposes of the holder being to equalize the tension from the bobbin and the take-up at the completion of each individual stitch; to allow the loop coming from the needle to readily pass around the bobbin and between it and the holder; to prevent the bobbin from rotating with the hook carrying the same at a time previous to the taking up of the loop from the needle by the looper of the hook, which accidental rotation is apt to snarl the thread; to reduce the friction between the bobbin and the rotating hook carrying the same, and to dispense, if desirable, with the bobbin-case and proportionately enlarge the bobbin proper.

In general the invention consists of the ordinary rotating hook carrying the bobbin; of a suitable spring-controlled pivoted holder

and tension-equalizer disconnected from and independent of the hook, having one arm, whose free end co-operates with and is controlled by a fixed cam on the hook-shaft for intermittently allowing the loop from the needle to pass around the bobbin and between it and the holder, and a second arm of proper contour for directly embracing the outer or exposed side of the bobbin and hold the same within the hook against the rounded inner end of the hook-shaft; of a suitable spring for restoring the holder-arm to its normal position against the bobbin after the loop has passed the point just referred to and the action of the cam on the hook-shaft has ceased its action upon the free end of the first arm of the holder; of a suitable sliding plate on the working surface of the bed-plate, carrying a hooked arm for grasping the holder-arm and retracting the same from out of engagement with the bobbin, thereby leaving the latter loose in its hook; of a suitable tripping-lever pivoted to the bottom of the sliding plate, the end of which lever is adapted to strike the loose bobbin and eject the bobbin from its position in the hook, and of other details now to be described.

Referring to the drawings, 1 represents the bed-plate, 2 the hook-shaft mounted on the under side of the same, and 3 the rotating hook secured to the outer end thereof. The end of the shaft 2 projects a suitable distance into the interior of the hook, the said projecting end 4 being rounded off and forming on one side of the hook a smooth bearing for the concave depression 5 of the bobbin 6. By this construction the bobbin is held at a suitable distance from the inner wall of the hook, thereby reducing the contact-surface between the bobbin and the hook, and hence reducing the friction between the two. When, therefore, the rotating hook is turning on its shaft, the tendency of the bobbin to rotate with it (especially before the looper of the hook takes up the loop coming from the needle) is reduced to a minimum and there is little or no liability for the thread snarling.

The new holder for retaining the bobbin within the hook while the latter is rotating may be described as follows: Pivoted preferably to a guide-plate 7, which guides the oscillating bar 8, that controls the feed mechan-

ism, (all these parts being old,) is a holder having a lever-arm 9, of suitable curvature, the free cam or rounded end thereof co-operating with a lateral cam-surface of the cam 10, located on the hook-shaft and whose radial cam-surface operates the feed mechanism, as is well known. With every revolution of the hook-shaft the lateral cam-surface of the cam 10 will oscillate the arm 9 about its pivotal point on the plate 7, the said arm being retracted to its normal position by the coiled spring 11, having one end secured to a convenient point along the arm 9 and its opposite end to a convenient point along the bottom of the bed-plate, the tension of the said spring being regulated and controlled by a thumb-nut 12 on a screw-threaded bolt 13, to which the opposite end of the spring is actually secured. The end of the lever-arm 9 is provided with an adjustable cam 14, said cam being secured by a screw-threaded bolt 15, as best shown in Fig. 10. The cam 14 is first accurately adjusted with respect to the degree of oscillation to be given to the arm 9, and then secured by the bolt 15.

The bobbin-holder has a second arm 16 extending at a suitable angle from the pivotal point of the arm 9 and parallel to the outer face of the bobbin when located in its hook and extending a sufficient distance beyond the hook, as best seen in Fig. 3.

Extending below the arm 16 and forming a part thereof and approximately opposite the middle of the diameter of the hook are depending forks 17, and extending in the opposite direction, substantially at right angles to the arm 16, is a guide-strip 18, all these parts taken collectively serving as a holder for the outer wall or face of the bobbin, and the guide-strip 18 serving additionally as a guide for the bobbin while the latter is being inserted into the hook.

To prevent the bobbin from falling through and out of the hook when the bobbin-holder is withdrawn or retracted from the bobbin, as subsequently to be explained, I provide two additional guide-prongs 19 on either side of the forks 17 and secured to any convenient point along the bottom of the bed-plate.

To release the bobbin from its holder and tilt or retract the latter out of engagement with the bobbin, so as to leave the bobbin in position to be ejected by the tripping-lever, I provide the following mechanism: Secured to the under side of the lateral sliding plate 20 on top of the bed-plate adjacent to the feed mechanism is a hooked arm 21, the hooked end being adapted to seize the outer projecting end of the arm 16 of the holder as the plate 20, to which the hooked arm is secured, is pulled outwardly, thus tilting the holder about its pivotal point on the plate 7 and retracting the arm 16, forks 17, and strip 18 out of engagement with the bobbin, leaving the latter loose in the rotating hook, as shown best in Fig. 5. The bobbin can now be ejected from the hook if properly struck from below. This I accomplish by

the following mechanism: Pivoted to the under surface of the plate 20 at a convenient point is a spring-controlled tripping-lever 22, operated by a striking-disk 23 at the end of the short outwardly-projecting arm 24 of the tripping mechanism. The relative position of the tripping-lever 22 is between the forks 17, and when the plate 20 is withdrawn, as above indicated, the free end of the tripping-lever is brought directly under the lower edge of the loose bobbin. It is apparent that if the disk 23 is suddenly struck by the hand of the operator it will trip the free end of the lever 22 upwardly, striking the bobbin and throwing it out from its hook onto the bed-plate. The striking-disk 23 is semicircular, and when the parts are in their normal position the straight edge of the disk meets the outer edge of the plate 20, and the two surfaces are thus contiguous. After the lever 22 has been tripped it is restored to its normal position by the coiled spring 25, wound about and having one end secured to a pin 26 and the opposite end operating and bracing against the lever 22. To prevent accidentally tripping the lever 22 when the plate 20 is closed and while the machine is running, I secure a guard-arm 27 to the bottom of the bed-plate, the curved outer end thereof abutting against the under surface of the striking-disk 23 when the parts are closed.

Inasmuch as I avoid the use of a bobbin-case with my present invention it becomes necessary to so qualify the construction of the bobbin to prevent the loop passing around it to accidentally pass between the two walls of the same. To insure the passage of the loop around the bobbin, therefore, I give the outer wall 28 a greater or more pronounced convexity along the edge thereof than the convexity given to the inner wall 29.

The operation of the rotating hook, with its contained bobbin, and the manner of forming the stitch are old and well known and need not be here described.

It is to be understood, of course, that in the formation of the stitch the loop taken up by the hook passes around the outside of the bobbin (or bobbin-case, when the latter is used) and between the bobbin (or case) and the holder, and where a holder is used (as it is invariably) the tension from the bobbin is constant during the entire formation of the stitch, the tension being made by the elastic spring, usually secured to the bobbin-case, and through and around which the thread from the bobbin passes as it unwinds from the latter. Where the tension from the bobbin is constant and that from the take-up is not so, or is not effected until at the close of the stitch, thin goods are apt to pucker by reason of this inconstancy of tension. By my improvement the moment the loop is cast off from the hook to pass around the bobbin the cam 10 on the hook-shaft is in position to engage the cam 14 on the arm 9, tilting the same, and consequently the lever 16, with its attachments, which constitute the holder proper, away from

the bobbin sufficiently to allow the loop to readily pass around the bobbin and between it and the holder. The holder thus yields or tilts under the action of the cams at the proper moment to insure easy passage of the loop around the bobbin. Further revolution of the hook-shaft permits the holder to again resume its normal position and seize the bobbin by the action of the spring 11, and thus insure the tension from the bobbin that is desirable at the completion of a stitch. At this moment, however, the take-up device has about reached the limit of its extreme upward stroke and tightened the thread coming from the needle, so that the tension with my improvement is simultaneous both below and above and the puckering of the goods is avoided. The holder in the present case, therefore, is not fixed or stationary, but oscillating or yielding, allowing with each oscillation the loop to freely pass around the bobbin and toward the end of the stitch to seize the bobbin, and thus insure the simultaneous tension from the bobbin and from the take-up. The holder as constructed, too, prevents the bobbin from rotating with the hook, (a danger common with stationary holders, where the distance between the holder and bobbin is constant and where the bobbin is not released at the moment of the passage of the loop around the same.) By the action of the yielding spring 11 the arm 16 is held against the bobbin, which rotates about the terminal rounded end of the hook-shaft, and thus the inside of the bobbin contacts only with this rounded end, thereby reducing the friction between that side of the bobbin and the hook to a minimum, and the liability of the bobbin turning with the hook disappears.

The manner of ejecting the bobbin has already been described and need not again be reviewed.

Having described my invention, what I claim is—

1. In a sewing machine, a rotating hook, a bobbin loosely carried by the hook, a tilting holder pivoted to the stationary part of the machine and normally in direct contact with the bobbin during a portion of a revolution of the hook, means operated by the running mechanism of the machine for wholly disengaging the holder from the bobbin during the passage of the loop around the bobbin, an in-

dependent sliding plate normally out of contact with the holder, and intermediate connecting mechanism carried by the plate and located to tilt the holder about its fixed pivotal point out of contact with the bobbin upon the withdrawal of said plate from its normal position, substantially as set forth.

2. In a sewing machine, a sliding plate, a spring-controlled tripping lever for forcibly ejecting the bobbin pivoted to said plate, a striking disk or plate at the end of the tripping lever, an arm carried by the plate, a rotating hook, a bobbin carried by the same, a yielding tilting holder, said arm being located to tilt said holder out of contact with the bobbin upon withdrawal of said plate from its normal position, substantially as set forth.

3. In a sewing machine, a suitable hook adapted to loosely contain a bobbin, a bobbin holder having an arm adapted to be brought in direct contact with one side of the bobbin, a second arm forming a part of said holder, a cam on the hook-shaft adapted to rotate thereby, an adjustable cam secured to or carried by the second arm of the holder and co-operating directly with the cam on the hook shaft, suitable forks secured to or forming a part of the first arm, and an additional guide strip on said first arm, substantially as set forth.

4. In a sewing machine, a suitable hook, a bobbin carried by the same, a yielding holder adapted to alternately directly engage with and disengage from the bobbin, a sliding plate on the bed plate of the machine, a hooked arm carried by the sliding plate and adapted to seize the holder and tilt the same out of engagement with the bobbin upon withdrawal of the sliding plate from its normal position, a tripping lever pivoted to the sliding plate, the free end of the said lever adapted to be brought in engagement with the bobbin and forcibly eject the same from the hook upon withdrawal of the sliding plate and consequent tilting of the holder, and additional means for preventing the tripping of the tripping lever when the slide plate is in its closed position substantially as set forth.

In testimony whereof I affix my signature in the presence of two witnesses.

ALBERT D. SMITH.

Witnesses:

EMIL STAREK,
JAMES J. O'DONOHUE.