

2 Sheets—Sheet 1.

No. 401,904.

Patented Apr. 23, 1889.

Fig. 1.

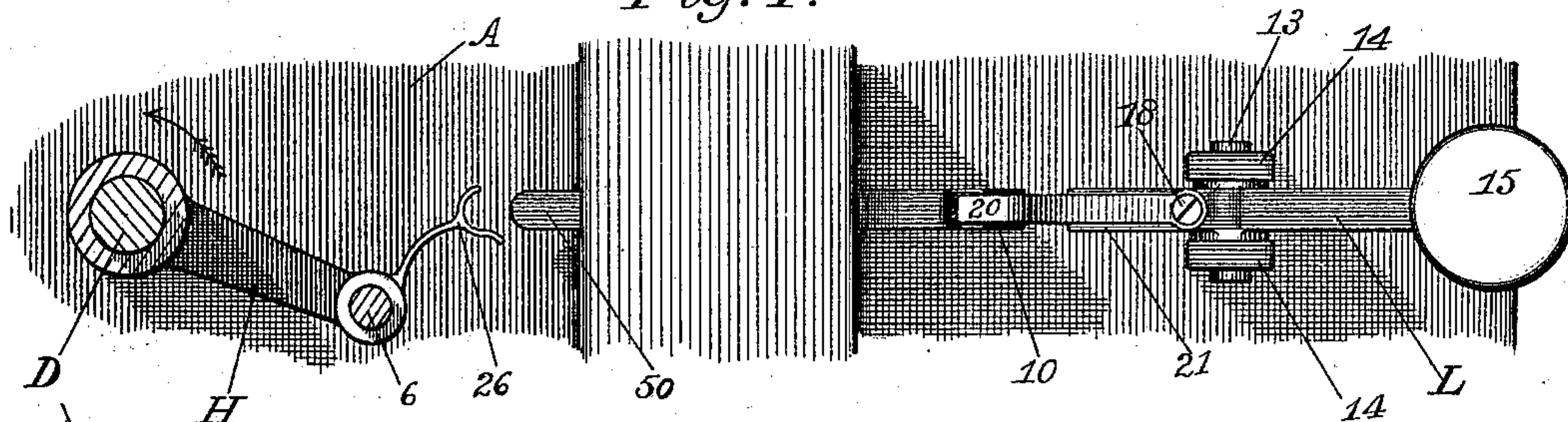


Fig. 2

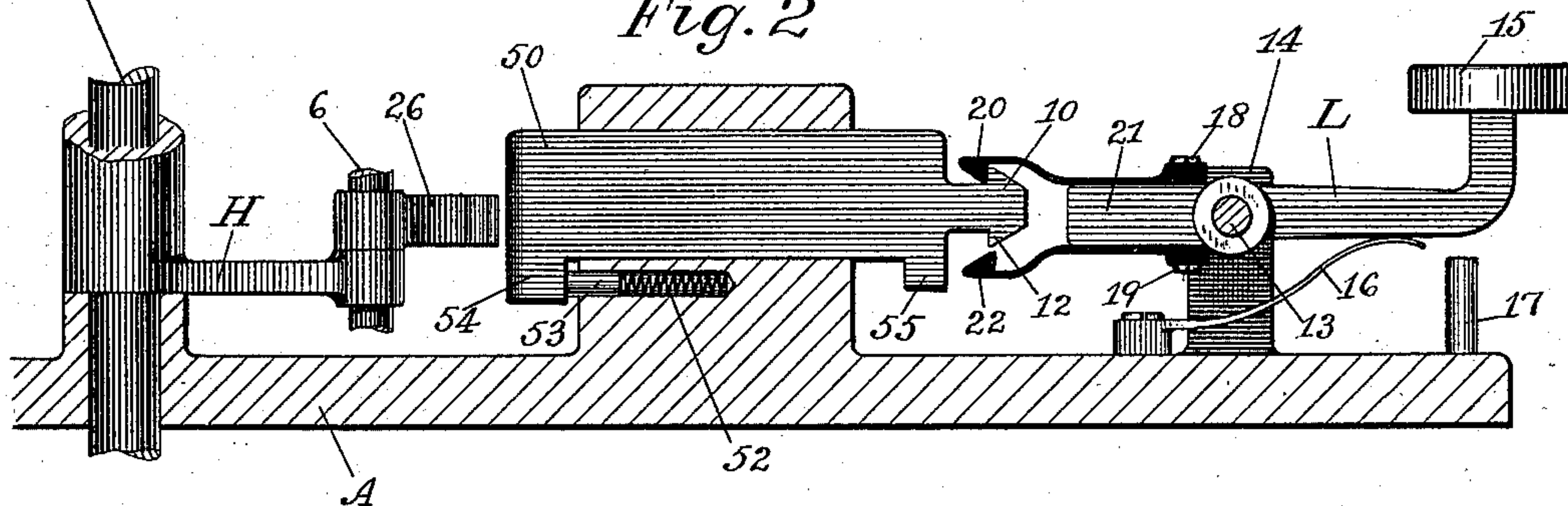


Fig. 3.

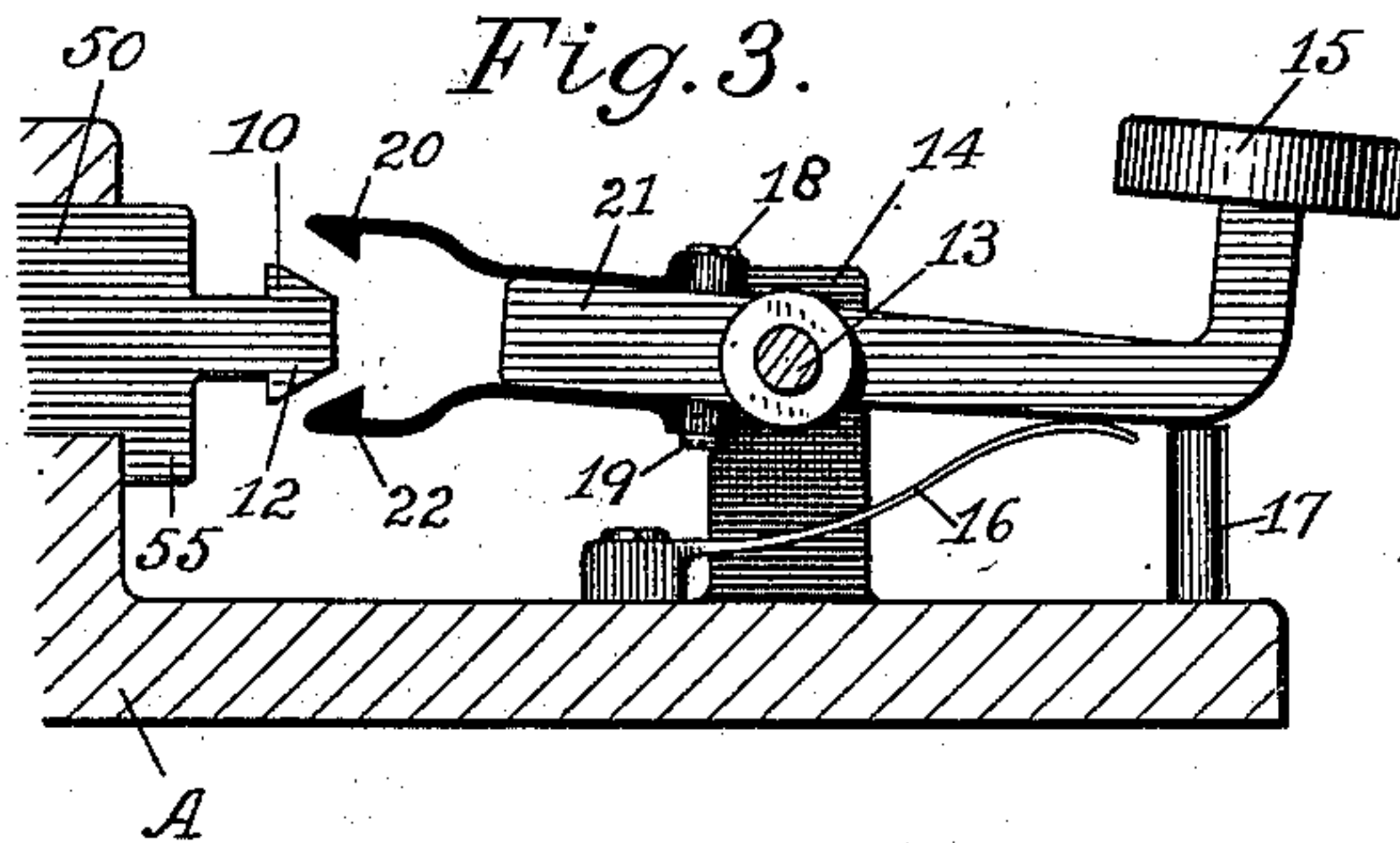


Fig. 4.

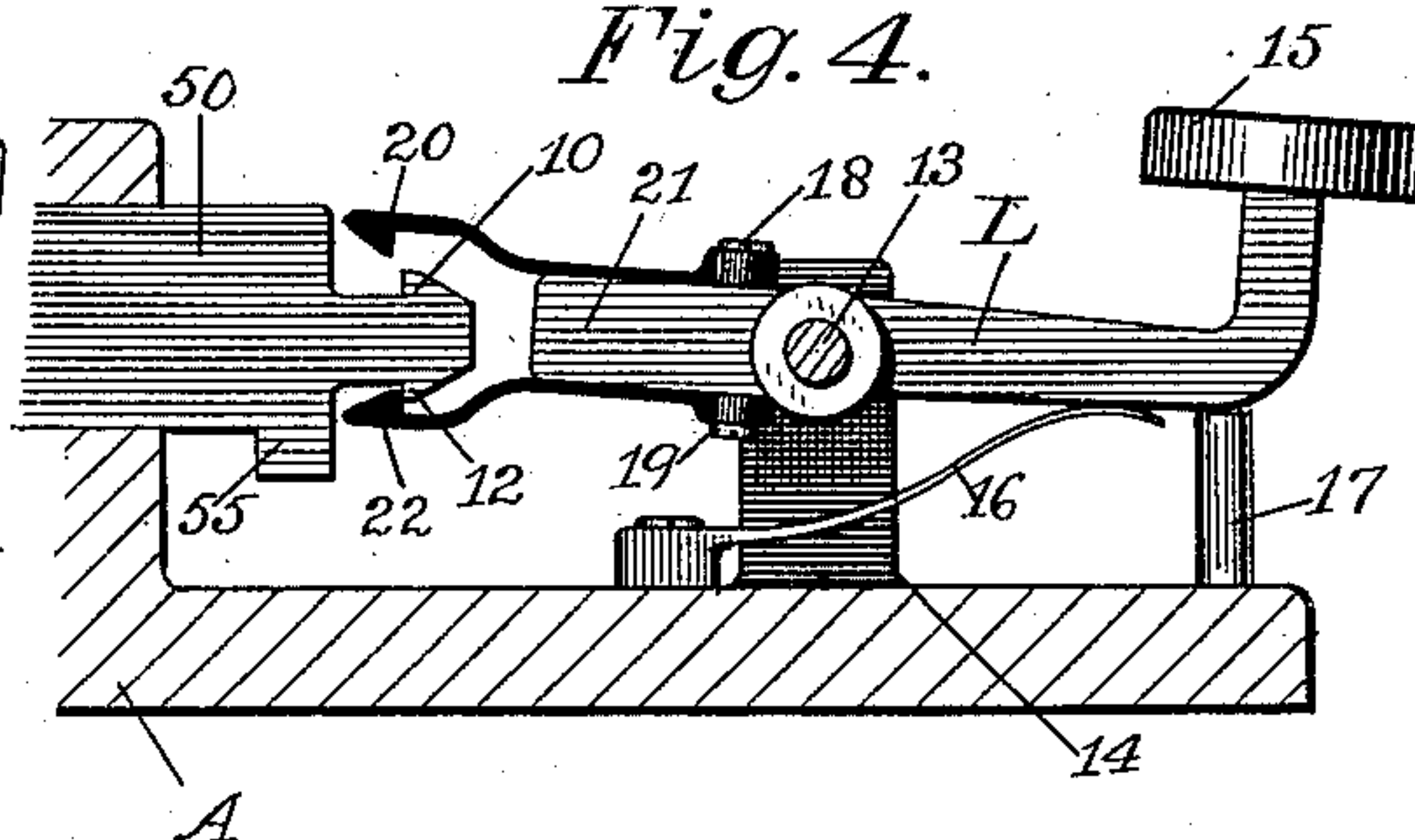


Fig. 5.

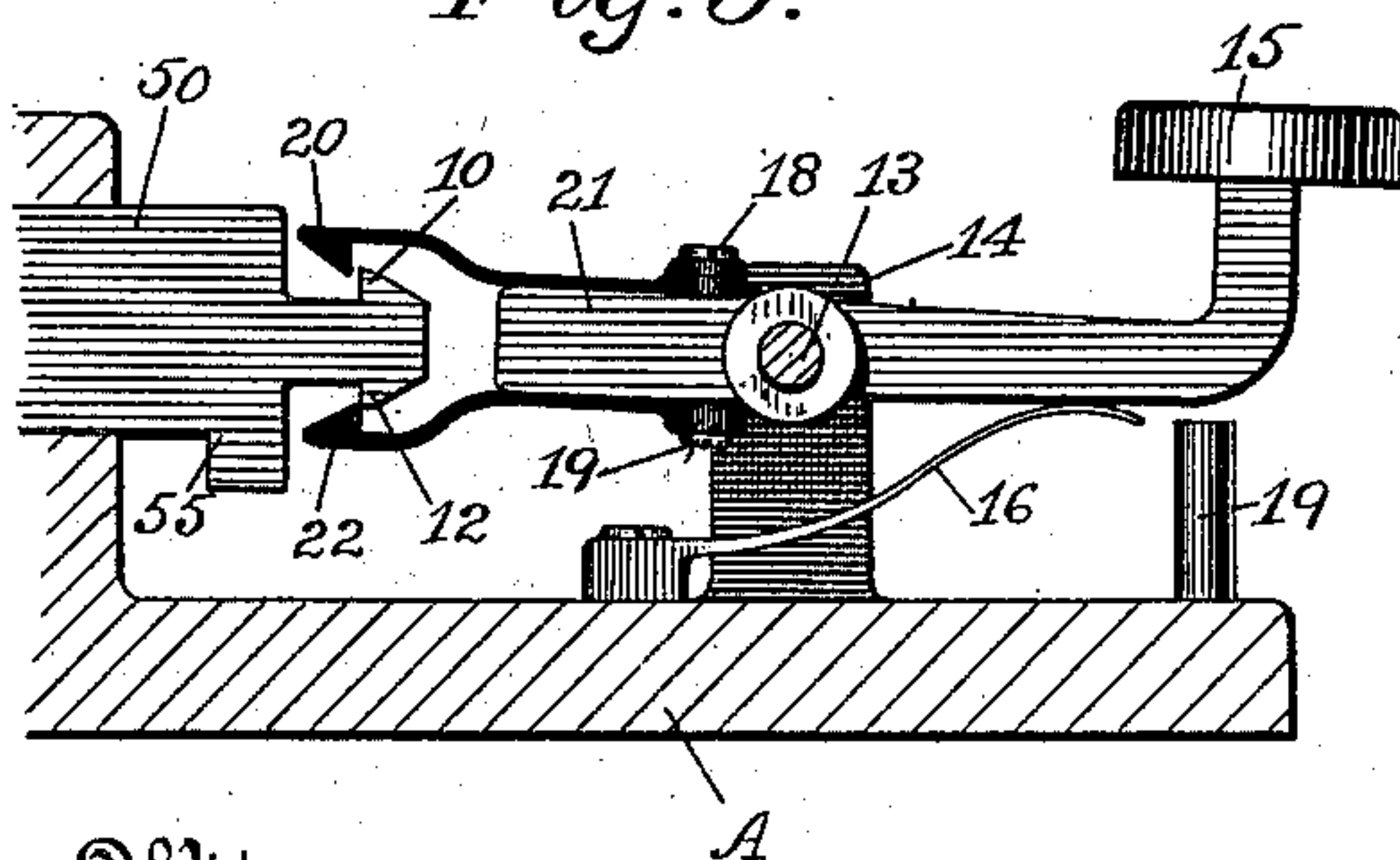
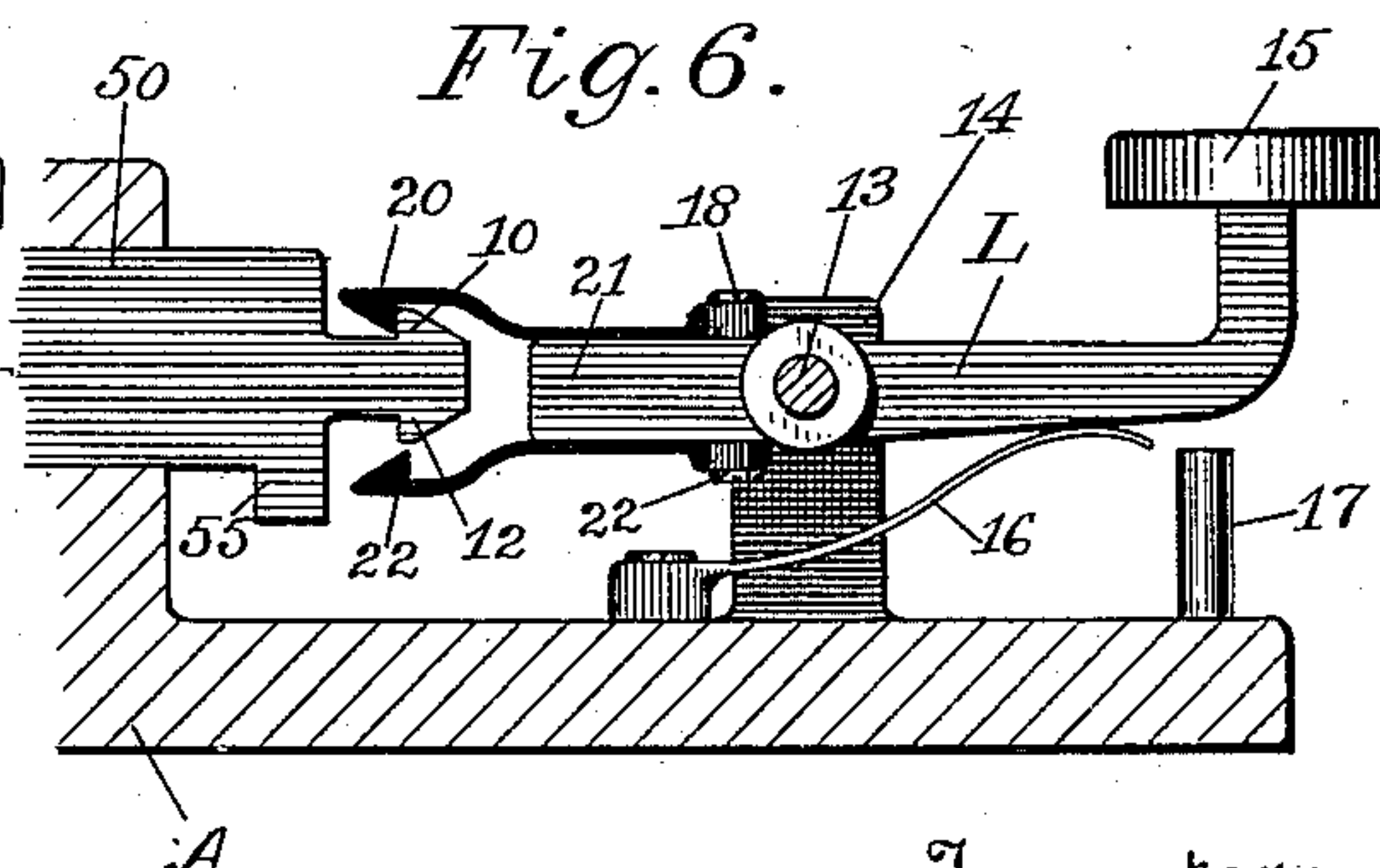


Fig. 6.



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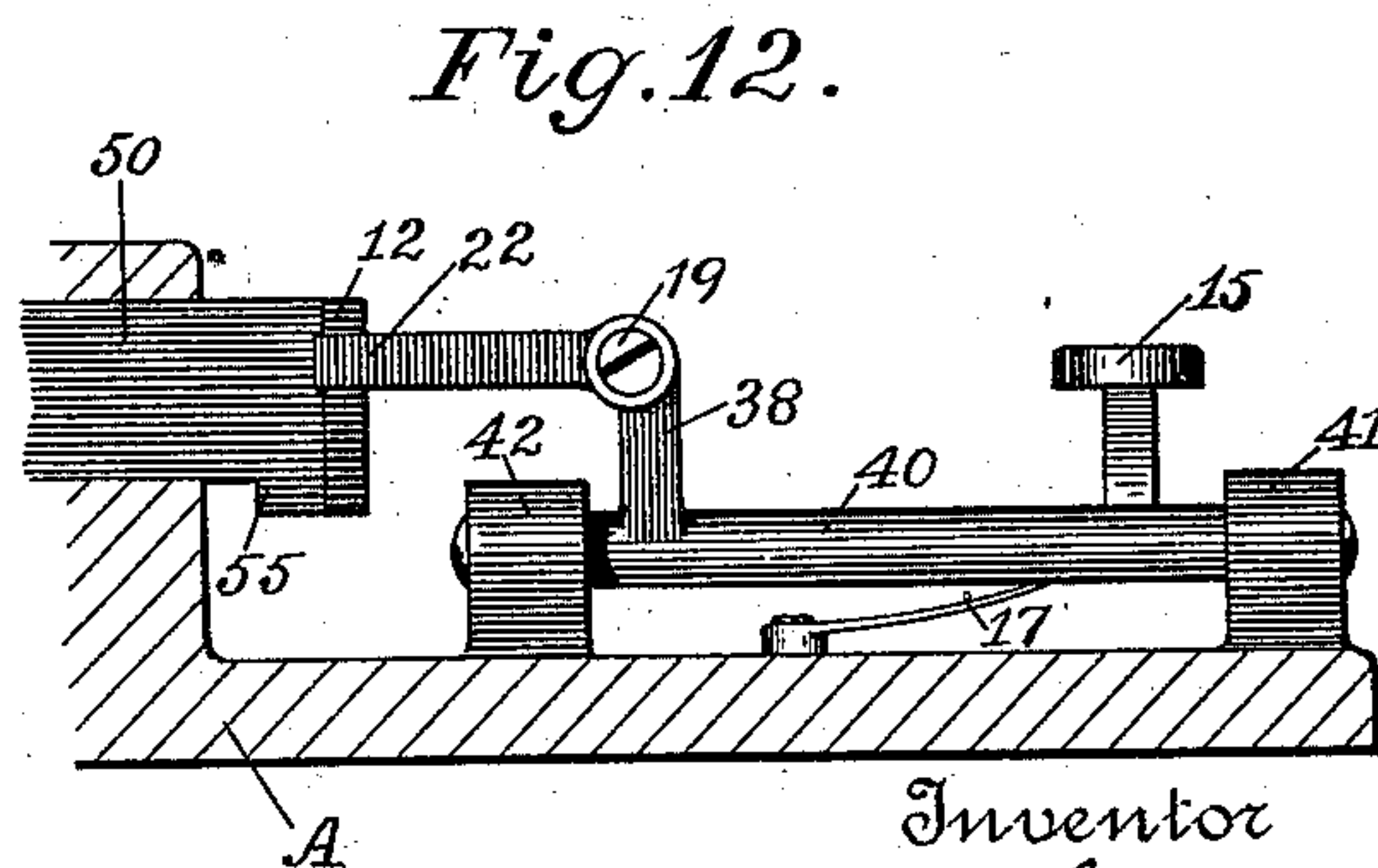
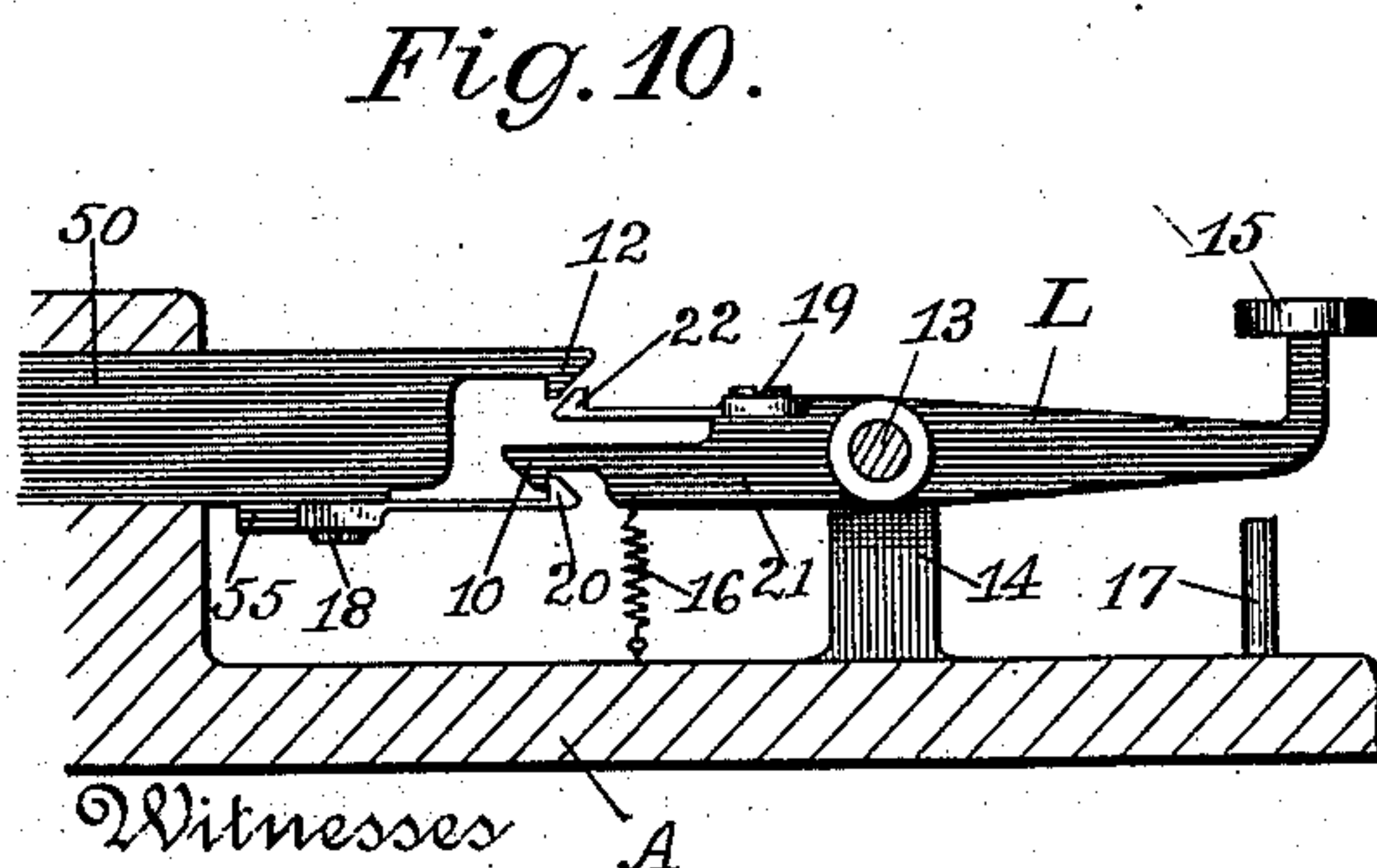
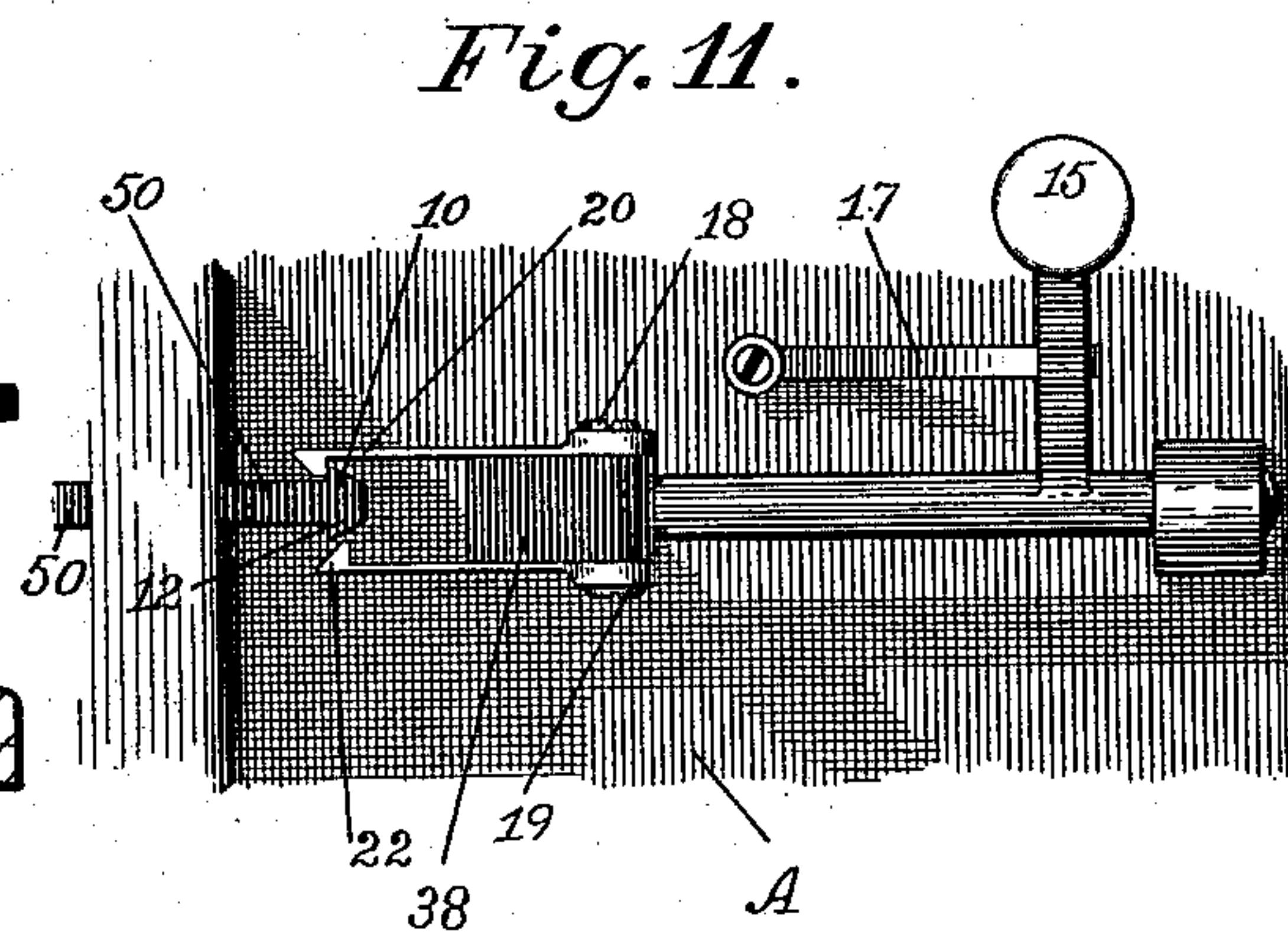
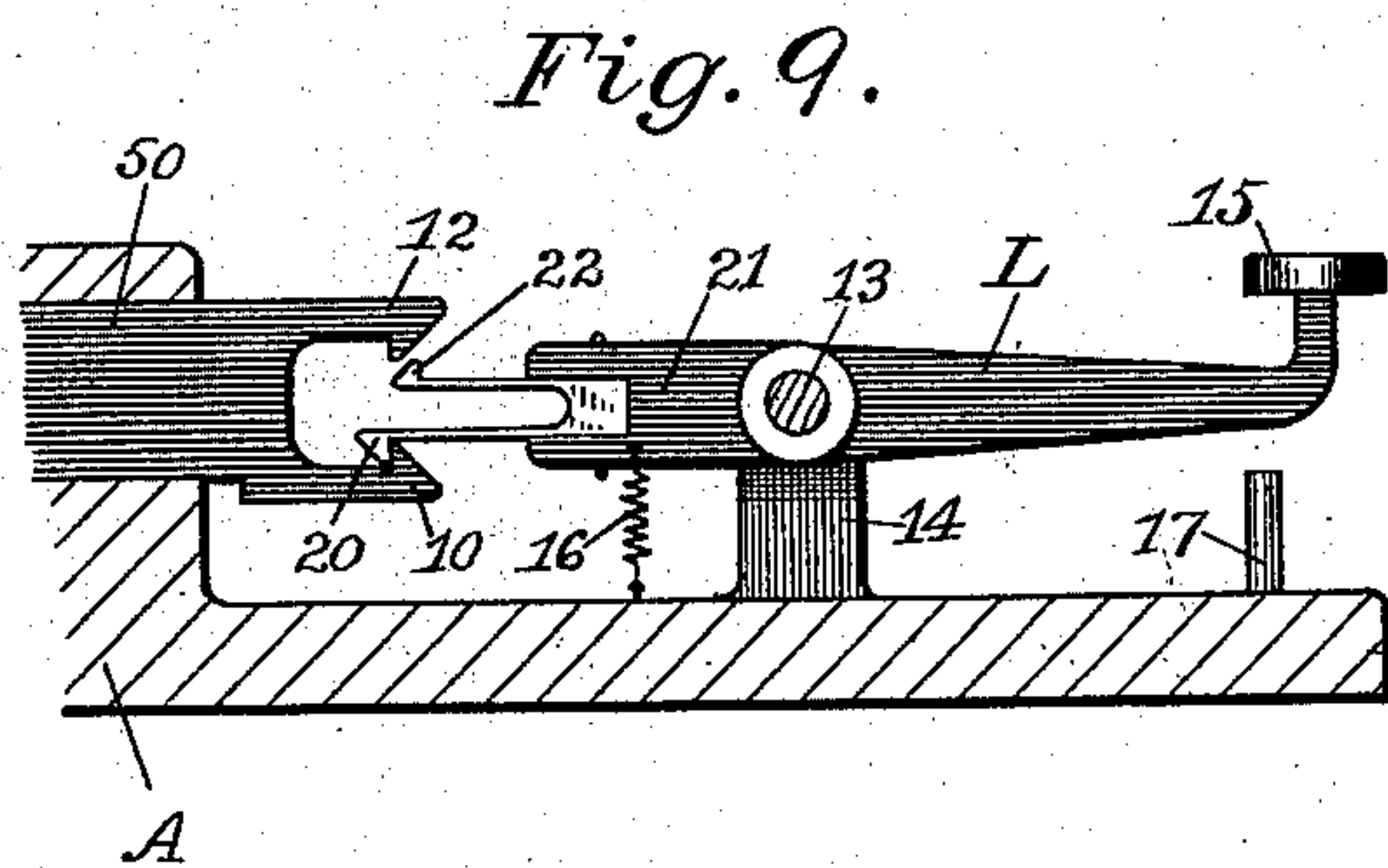
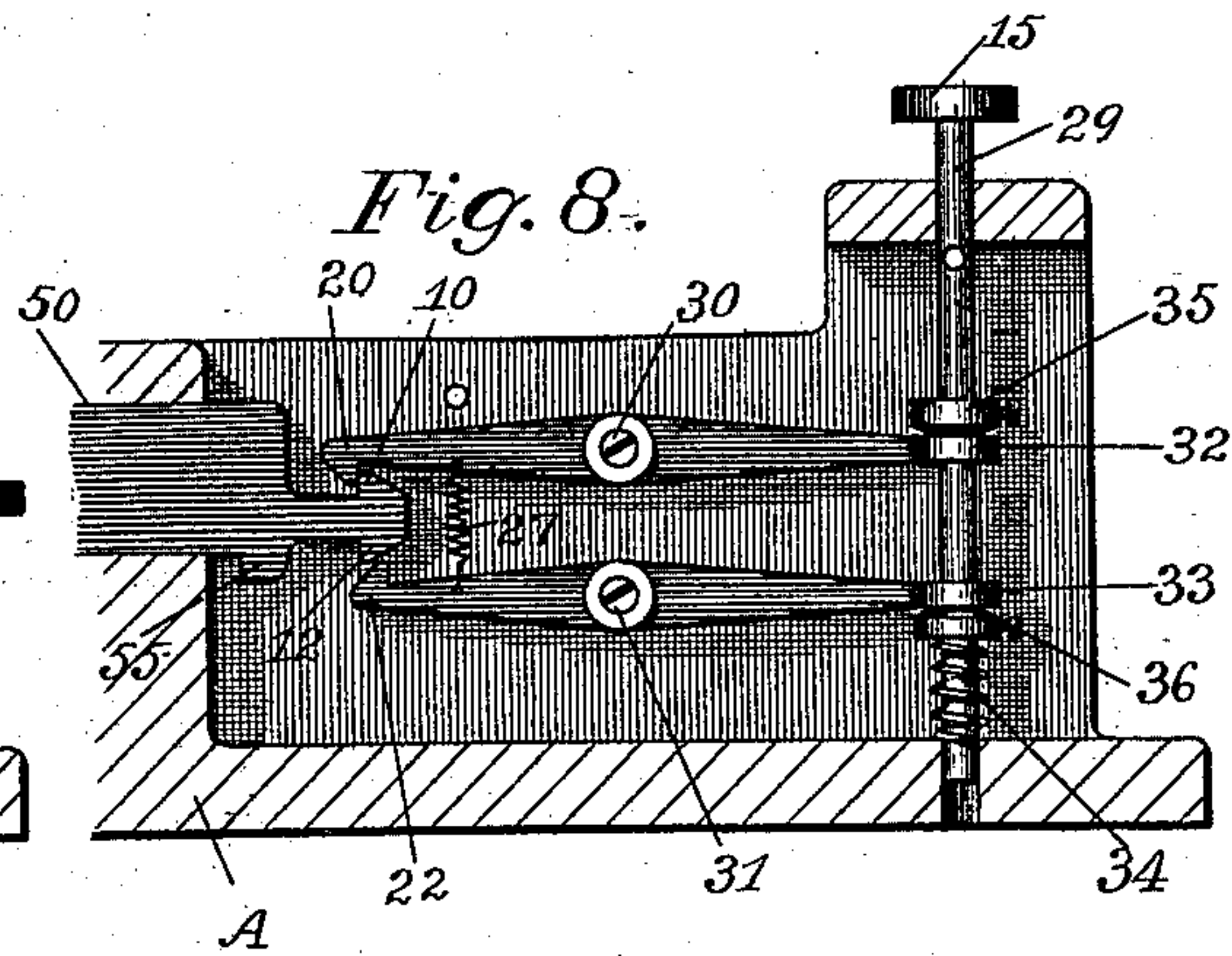
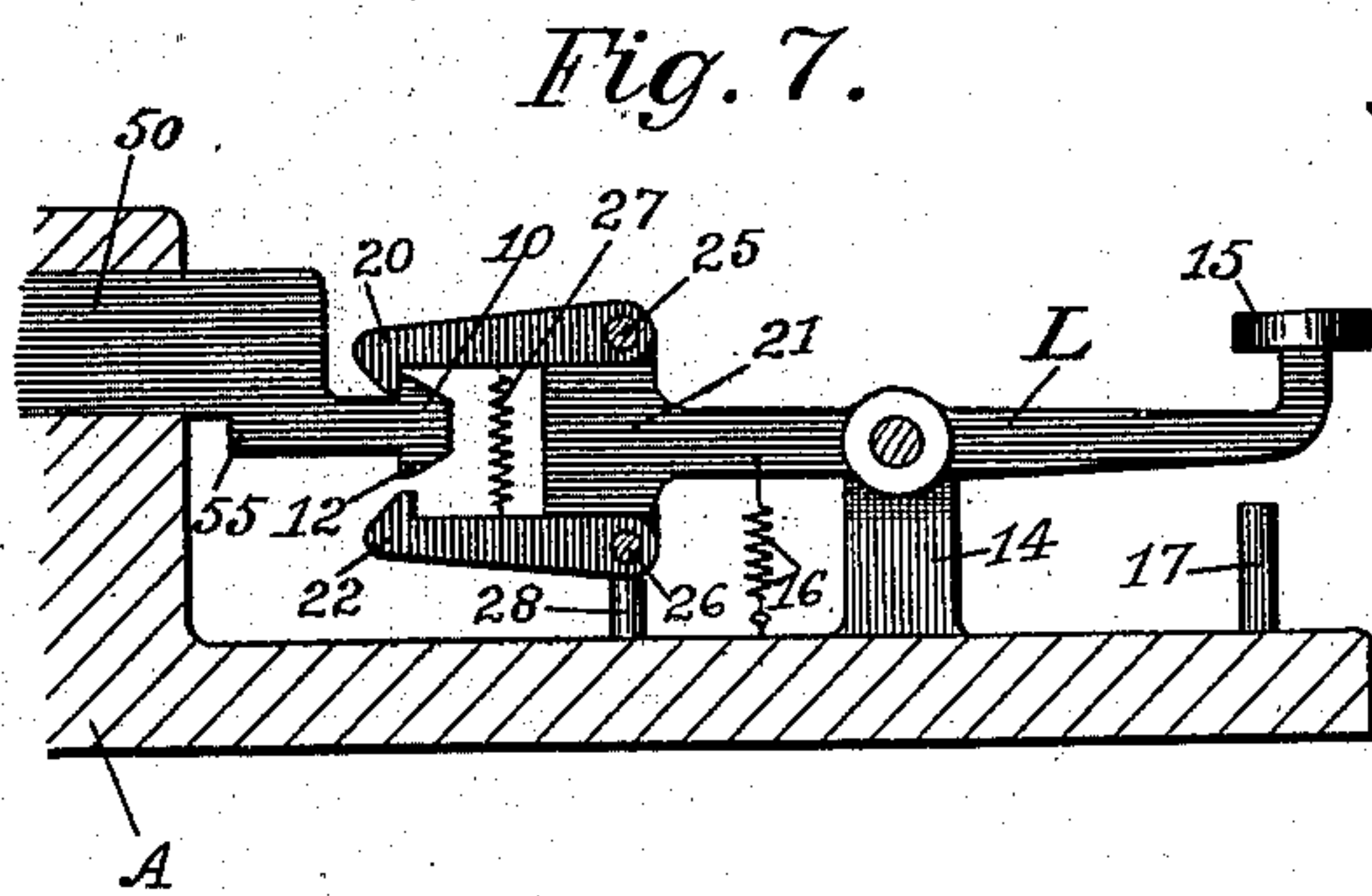
(No Model.)

2 Sheets—Sheet 2.

F. H. RICHARDS.
MECHANICAL MOVEMENT.

No. 401,904.

Patented Apr. 23, 1889.



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UNITED STATES PATENT OFFICE.

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MECHANICAL MOVEMENT.

SPECIFICATION forming part of Letters Patent No. 401,904, dated April 23, 1889.

Application filed March 30, 1887. Renewed May 21, 1888. Serial No. 272,535. (No model.)

To all whom it may concern:

Be it known that I, FRANCIS H. RICHARDS, a citizen of the United States, residing at Springfield, in the county of Hampden and State of Massachusetts, have invented certain new and useful Improvements in Mechanical Movements, of which the following is a specification.

This invention relates to that class of mechanical movements which includes the one described and claimed in my application, Serial No. 218,973; and the present invention consists in certain improvements in the latch mechanism forming a part of the subject-matter of my said prior application, as hereinafter more fully set forth.

In the drawings accompanying and forming a part of this specification, Figure 1 is a plan view of so much of a mechanical movement of the class specified as embodies my present invention. Fig. 2 is a sectional side elevation of the latch mechanism proper, showing the latch set ready for use. Figs. 3, 4, 5, and 6 are views showing the catches and latch in four successive stages of their operation. Figs. 7 and 8 are side elevations showing modified constructions of the catches. Figs. 9 and 10 show in similar views certain rearrangements of the catches, these being in themselves substantially unmodified. Figs. 11 and 12 are respectively a plan and side elevation of another modified construction and arrangement of the apparatus.

Similar characters designate like parts in all the figures.

The frame-work A, of any preferred construction adapted to carry the mechanism, has a stud or shaft, D, on which turns a revoluble frame or turret, H, that carries the shaft 6, having thereon the starting-arm 26. Said frame also has formed therein a suitable bearing for a reciprocating (or rotary reciprocating) latch, 50, which is thrown forward (toward the left hand, as shown in the drawings) by a spring, 52, acting through rod 53 against projection 54, formed on said latch, a suitable stop, as 55, being provided to properly limit the forward movement of the latch. The object, construction, and mode of operation of these several parts are fully described in my

aforesaid application, No. 218,973, to which reference may be had.

According to my present invention the latch 50 (whatever its form may be) is provided with two catches oppositely disposed, and the tripping-bar (whatever its form) is similarly furnished with two catches arranged to be successively engaged with those of the latch. The catches on one of said parts, on either the latch or the tripping-bar, are so constructed and arranged that one of them will sooner than the other engage its corresponding latch-catch, and so that when such result happens the one so caught may be disengaged and the latch remain hooked back by the opposite pair of catches until these are in due succession also disengaged; and of said four catches two are yielding and two are fixed as to their relative position to each other in one direction. These features will be understood by the following detailed description of the mechanism shown in the first six figures.

The latch 50 has two fixed catches, 10 12, of the usual ratchet-tooth form. These catches are oppositely disposed, being one on the upper side and one on the lower side of said latch, or, as shown, of a rearward extension thereof. Said catches also have or may have their vertical faces one directly over the other, thus simplifying the construction of said latch.

The tripping-bar is a key-lever, L, and is a substantially-rigid bar of any convenient proportions pivotally supported at 13 between fixed posts, (uprights,) as 14, on bed or frame A. Said lever is furnished with a finger-key, 15, and there is provided some suitable spring, as 16, for holding up the same. A stop, 17, serves to properly limit the downward stroke of the key and its lever. The forward (left-hand) end, 21, of the key-lever reaches (preferably) nearly to the latch, (when this is in its rearward position,) as in Figs. 2 and 4, and carries thereon two oppositely-disposed spring-catches, 20 22, fastened to said lever by screws 18 19 or otherwise, as may be preferred. These screws (or other like fastenings) being at some distance from the outer end of part 21, said part 21 serves as a stop to prevent catches 20 22 from coming too near each other,

and thus interfering with the proper operation of the apparatus. Of said two spring-catches one of them (in this instance the upper one) is set a little farther forward than the other, as well shown in Fig. 2; but in practice it is immaterial whether the spring-catches or the fixed catches are thus set out of vertical alignment.

My improved latch mechanism operates in a general way after the manner of an escapement, and when constructed as thus above described its particular mode of operation is as follows: The normal position of the several details when standing idle ready to be used is shown in Figs. 1 and 2. In this position the latch 50 is held back by the engagement of its fixed catch 10 with the upper spring-catch, 20, which latter catch it will be observed serves as a stop for limiting the upward movement of the finger-key. It will also be observed that spring-catch 22 stands just below and for a part of its length directly underneath the lower fixed catch, 12, as shown in Fig. 2. Said parts being thus situated and the turret H being revolving, but shaft 6 not revolving (except orbitally,) the operator presses down key 15, thereby swinging lever L on its pivot and bringing catch 22 up against catch 12. This obviously limits for the time being the upward movement of said catch 22; but this catch is yieldingly fixed to part 21 of said lever, so that a continued and increasing pressure on the key will cause said part 21 to continue its upward movement and forcibly disengage catch 20 from catch 10, and thus allow spring 52 to drive forward the latch, as in Fig. 3. Suppose, now, that the operator still holds the key in its lower position, as in Figs. 3 and 4, and that while thus held the starting-arm 26 forces back the latch, as described in my aforesaid prior application. In such case the lower fixed catch, 12, is driven back over and into engagement with the lower spring-catch, 22, which thereby holds back latch 50, as in Fig. 4; and this return of the latch may and often will in practice follow very quickly after its forward movement, much sooner, in fact, than the operator can conveniently take his finger from the key; but owing to the organization of the system of catches, when the key begins to move up and catch 22 to move down (by the power of spring 16 or otherwise) off from catch 12, as in Fig. 5, the catch 20 (standing then a little forward of catch 10) moves down in front of said catch 10, ready to hold the same at the moment the said lower catch disengages. This restores the said escapement apparatus to the position shown in Fig. 6, which is the same as a part of Fig. 2, ready for another operation.

In Fig. 7 the above-described apparatus is shown in a slightly-modified form. The spring-catches 20 22 are here pivotally attached to the lever L at 25 26, and are held together by a spring, 27. An additional stop, 28, is or may be provided to limit the upward movement of key 15. The operation of this

form is in no wise materially different from the preceding.

In Fig. 8 the key 15 is on a stem, (tripping-bar,) 29, operatively connected to the said spring-catches, which are in this case pivoted directly to the main frame at 30 31. Catch 20 has an arm, 32, and catch 22 an arm, 33, through both of which arms the stem 29 passes freely. A spring, 34, serves to lift said stem, while collars 35 36, fixed thereon, serve to communicate motion to the said arms, to each in one direction only. On pressing down the key arm 33 follows down on collar 36 only until catch 22 rests on catch 12, after which the further downward movement of the stem carries down arm 32 to unhook catch 20 from catch 10, and thus release the latch, as before. This modification, therefore, differs only structurally from the preceding forms of the same apparatus.

In Fig. 9 I have illustrated a rearrangement of the form first above described. In this both the fixed and the spring catches are reversed, as shown, but are still oppositely disposed and still operate in substantially the same manner.

In Fig. 10 I have shown a further rearrangement, in which the one each of the spring and the fixed catches are on the latch and one each are on the key-lever; but even this arrangement does not essentially change the character and operation of the apparatus.

In Figs. 11 and 12 I have shown a modified construction of the apparatus, in which the spring-catches are arranged to swing on an axis about parallel to the line of movement of latch 50. By this plan the fixed catches are placed on the sides of the latch and the spring-catches are secured on an arm, 38, that is fixed to the shaft 40, (journaled in bearings 41 42,) to which the key is attached. The result of this modification is that the movement of the spring-catches is crosswise to their movement in the preceding forms of the apparatus.

It will now be understood how in my improved apparatus the four catches are organized and arranged so that whatever various forms they may have there are two catches having a movement in one direction and two catches having a movement in a crosswise direction, and how that at least two of said four catches have an escapement-movement relative to each other. It will also be understood that said apparatus is capable of modification in various ways and degrees other than the ways described, after the manner of machines in general, within the scope and limits of my invention.

Having thus described my invention, I claim—

1. The combination, in a latch mechanism of the class described, of a reciprocating latch, a tripping-bar, and four catches arranged in two engaging pairs, two of said catches being on the latch and two of them operatively connected to said bar, and those

on one said part being constructed and arranged to be successively engaged with and disengaged from those on the other said part, substantially as described, and for the purpose specified.

2. The combination, in a latch mechanism of the class described, of a reciprocating latch, fixed oppositely-disposed catches on said latch, a tripping-bar, and oppositely-disposed spring-catches on said bar, one of said spring-catches being constructed and arranged to engage sooner than the other with

the corresponding fixed catch, substantially as described, and for the purpose specified.

3. The combination, in a latch mechanism of the class described, of the latch having fixed catches 10 12, lever L, having the projecting end 21, and the spring-catches 20 22, carried on said lever, all constructed to operate substantially as described.

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Witnesses:

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