

C. W. ZIPPERER.
CLAMPING AND LIFTING TONGS.
APPLICATION FILED JULY 7, 1904.

Fig. 1.

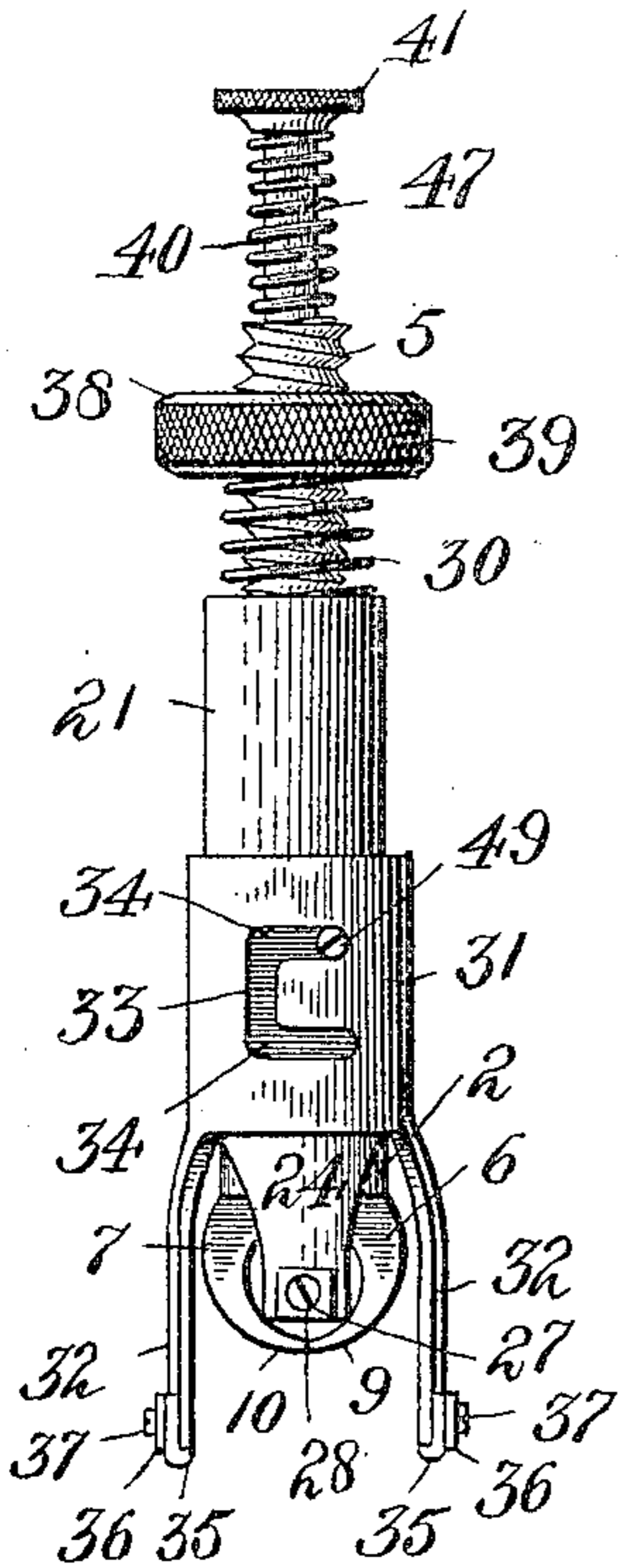


Fig. 3.

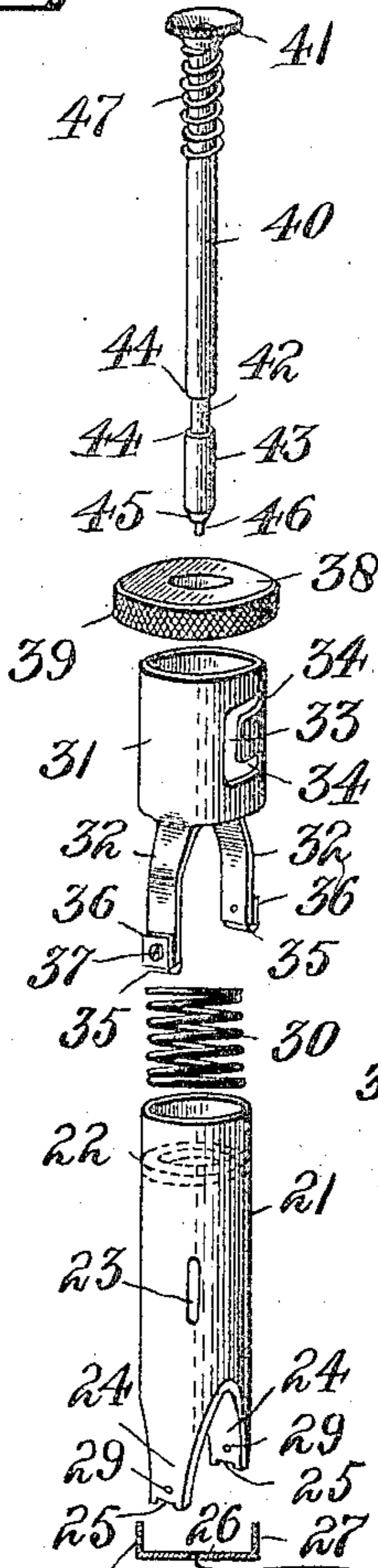


Fig. 2.

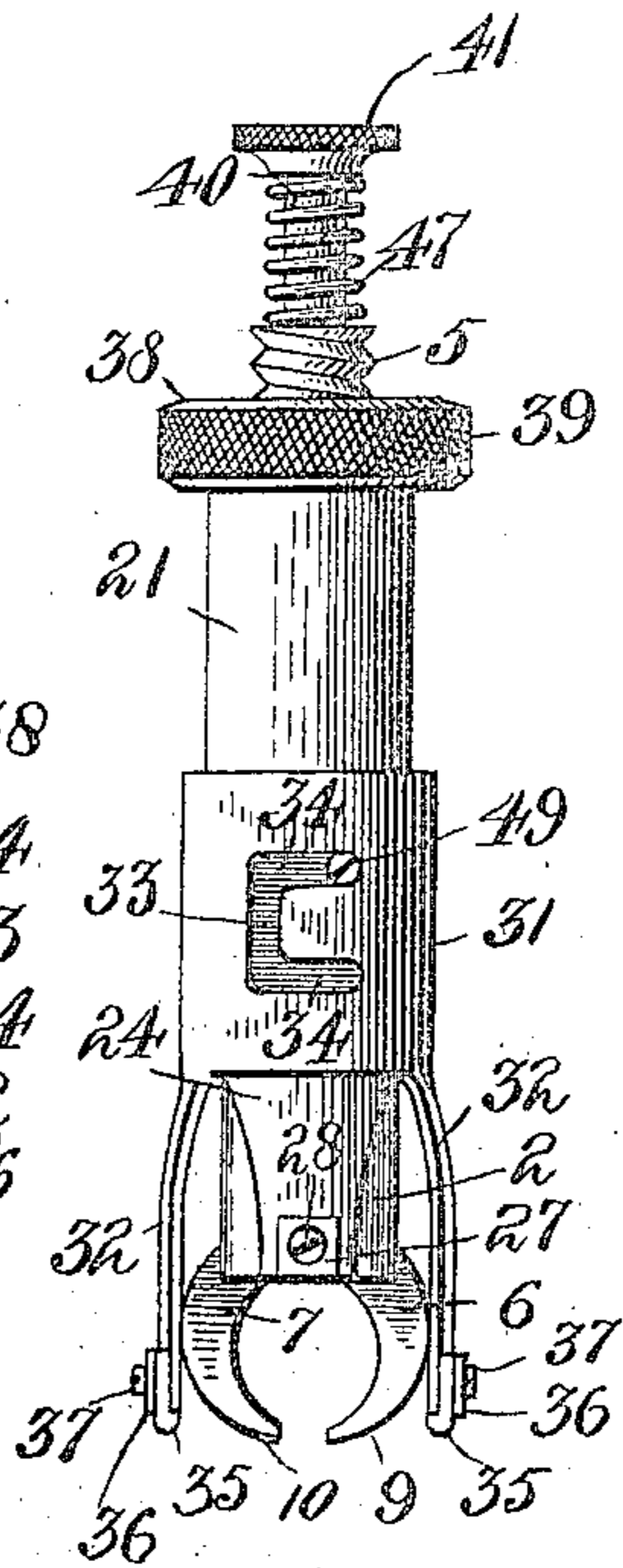


Fig. 4.

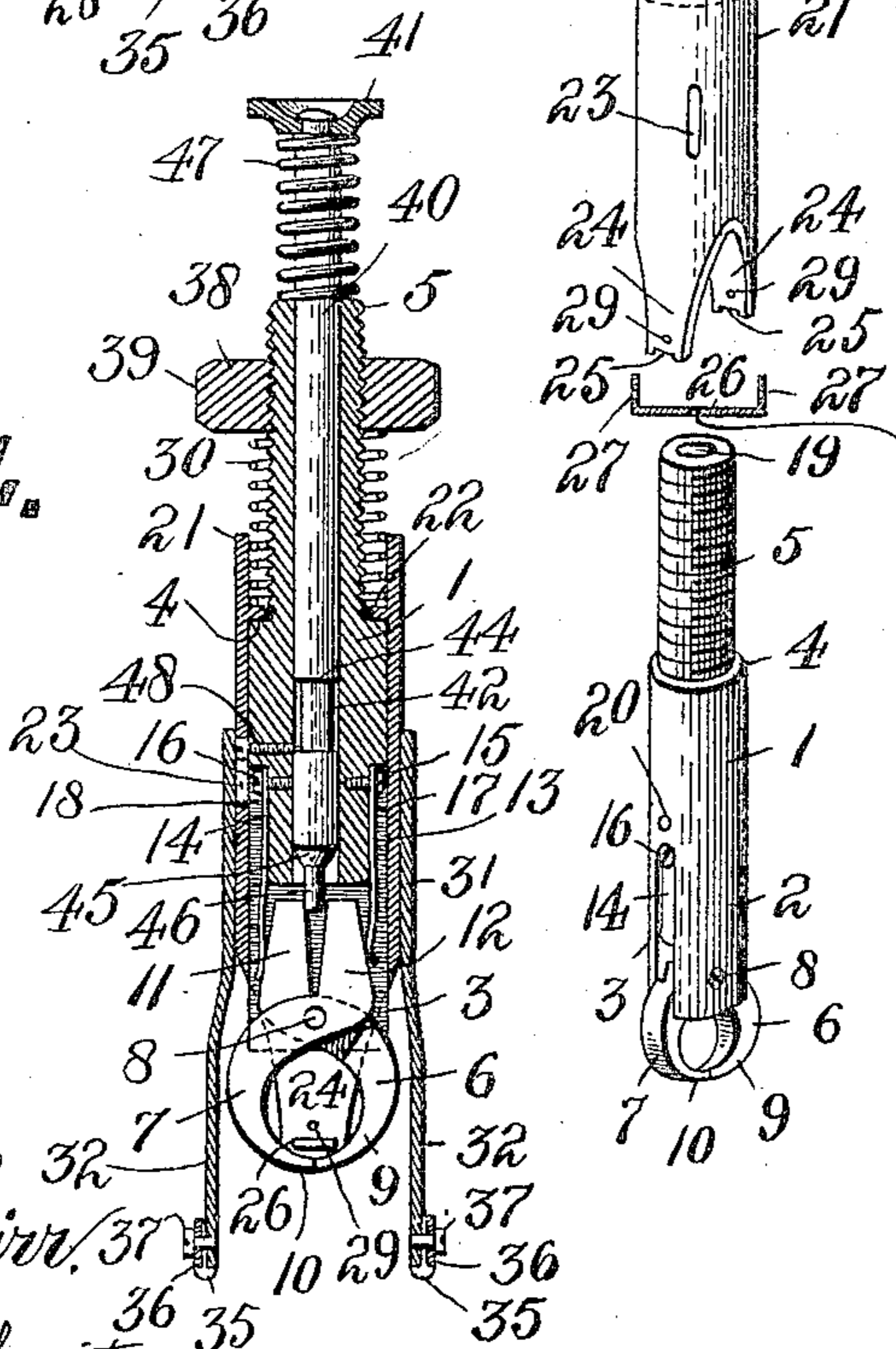
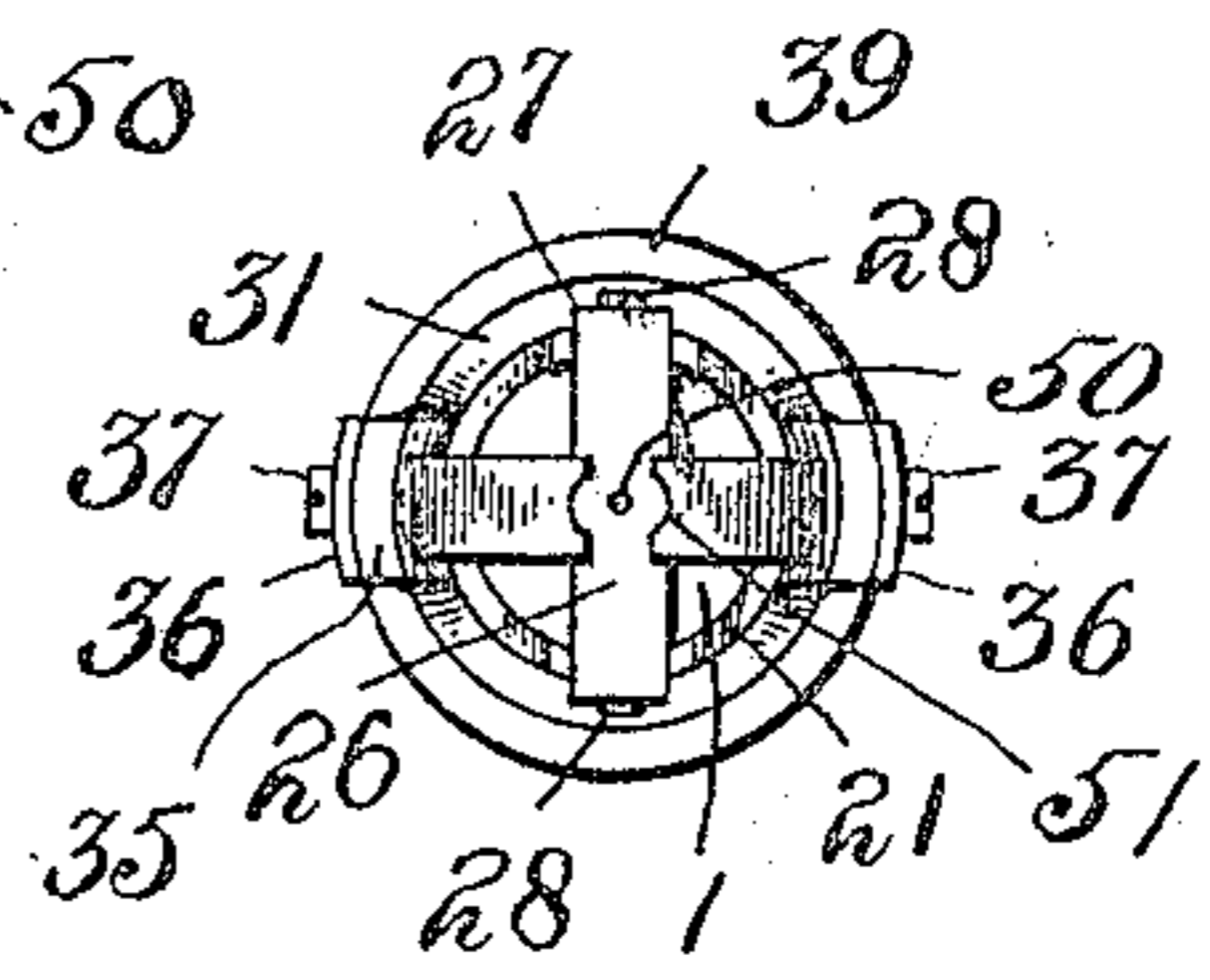


Fig. 5.



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CLAMPING AND LIFTING TONGS.

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To all whom it may concern:

Be it known that I, CARL WILHELM ZIPPERER, a subject of the German Emperor, residing in Munich, Kingdom of Bavaria, Empire of Germany, have invented a new and useful Improvement in Clamping and Lifting Tongs, of which the following is a description.

This invention relates to tongs or clamping instruments for jewelers' and watchmakers' use, and particularly to clamping-tongs which are used for the purpose of removing and extracting parts and portions of watches and other like mechanisms which are held by friction and which require careful and delicate manipulation.

An object of this invention is to provide a tool capable of engaging and extracting and removing the various parts of such delicate mechanisms as watches and which will afford protection against injury to and breakage of such parts and the mechanism.

Another object of this invention is to provide a tool which, owing to its dimensions and its mode of operation, is specially adapted for use by watchmakers and repairers for the purpose of removing watch-hands from their posts, the "table-roller" from its shaft or staff, the roller-jewel, and various other delicate parts which require careful handling and manipulation.

Another object of this invention is to provide a tool by means of which the small bolts, nails, pivots, rivets, and other articles and devices which are usually held in place by friction or otherwise in a given article may be conveniently, quickly, and easily removed.

With the above objects in view, and others which will be disclosed and referred to during the course of this description, this invention consists in the parts, features, and combinations of elements hereinafter described and claimed.

Referring to the drawings forming part of this description, Figure 1 represents in elevation the tongs or implement constructed in accordance with my invention. Fig. 2 represents in elevation the tongs of Fig. 1 in a different position—that is, with the parts depressed so as to throw the gripping and holding fingers open preparatory to causing the same to grasp and extract the desired part. Fig. 3 shows in detail perspective the various parts of my tongs, said parts being in such relative position that the manner of assembling the same is readily apparent. Fig. 4 is a longitudinal central section of the implement, showing the parts in the position of Fig. 1; and Fig. 5 is a bottom plan view showing in detail the construction of the gripping-fingers and the parts adjacent thereto.

In the drawings the numeral 1 indicates the tubular cylindrical body portion which supports the gripping-fingers, the lower part of the body portion being longitudinally bifurcated or divided to provide the prongs 2 and 3. The portion 1 is also provided with the shoulder 4, formed by reducing the upper end thereof, said reduced portion being screw-threaded, as indicated at 5, the pitch of which may be varied. In the slot or bifurcation the gripping and holding fingers 6 and 7 are pivoted by means of the screw 8, which passes first through the prong 2, then through the respective fingers, and then into the prong 3. This screw 8 supports the fingers 6 and 7 and permits their pivotal movement. The fingers 6 and 7 are formed substantially semicircular and are arranged so that their gripping ends 9 and 10 may be normally in contact. The fingers 6 and 7 are provided, respectively, with extended ends 11 and 12, arranged substantially at a right angle to the adjacent finger portions. These two ends 11 and 12 are caused normally to approach each other by means of springs 13 and 14, which bear upon the ends 11 and 12, respectively, the springs being held by means of screws 15 and 16 in seats or grooves 17 and 18, respectively, formed in the body portion 1 directly above the bifurcation. The body portion 1 is smooth-bored at 19 from end to end and is also provided with a screw-threaded aperture 20, passing through to the central bore, the purpose of which will be described presently. The extensions 11 and 12 have their adjacent surfaces constructed so as to diverge from each other from the pivotal point 8, and the gripping-fingers 6 and 7 are so proportioned that their gripping ends 9 and 10 when in engagement with each other will prevent the extensions 11 and 12 from coming together, thus providing a space between them sufficient for the entrance of the actuating-pin hereinafter described. The springs 13 and 14 may be constructed in any suitable manner, so as to exert the requisite amount of pressure upon the gripping-fingers to both hold them normally together and enable them to firmly en-

gage and hold the part operated upon and to be lifted and extracted.

A sheath or casing 21 is made sufficiently large to slide over and snugly fit the body portion 1, the shoulder 4 when the parts are in proper position engaging the bottom of an interior circular flange 22, provided on the sheath. The sheath 21 is also provided with an elongated slot 23, which when the parts are properly adjusted registers with the aperture 20 in the body portion 1. The lower end of the sheath 21 is suitably formed to provide the feet 24, provided at the bottom with the angular recesses 25. When the sheath is in place, the feet 24 will be caused to face the flat sides of and extend substantially parallel with the gripping-fingers 6 and 7. In the recesses 25 is set a cross-bar 26, the ends of which are turned at an angle thereto, so as to provide lugs 27, through which screws 28 may pass for securing the cross-bar to the feet 24, the screws passing through the lugs 27 and entering the screw-threaded apertures 29 in said feet 24. When these parts are in proper position, the cross-bar 26 will extend between the gripping-fingers 6 and 7, the lower ends of which latter will always operate below said cross-bar. (See Fig. 4.)

The coiled spring 30 is made of a diameter sufficient to freely enter the sheath 21, wherein it will rest and find a support upon the flange 22.

31 is a collar provided with depending legs 32 and a slot having the vertical portion 33 and horizontal portions 34 at each end of the latter. The legs are each provided at their lower end with a soft pad 35, of any suitable material—such as kid, leather, or chamois skin—the same being clamped thereon by means of a plate 36 and screw 37, the latter passing through said plate and into the leg. These pads prevent the legs from scratching or otherwise marring or injuring the enameled surfaces of watch-dials or other polished surfaces. The legs 32 are given any form which may be found convenient and suitable for the purpose of permitting free action of the gripping-fingers 6 and 7 and to this end may be made slightly bowed longitudinally and in cross-section concavo-convex. This structure gives lateral freedom of movement to the fingers 6 and 7 and without a great spread of the legs affords room for the operation of said fingers.

38 is an adjusting-nut which screws upon the part 5 of the body portion 1 and against the bottom of which the spring 30 exerts its pressure, so as to lift the body portion, with its fingers 6 and 7, into the position of highest elevation. (Shown in Fig. 1.) The periphery of the nut 38 is knurled at 39 to enable it to be easily manipulated.

40 is the actuating-plunger, the exterior of which is quite smooth in order to permit it to freely slide within the longitudinal bore 19

of the body portion 1. At its upper end the plunger is provided with the head 41, by which the same may be manipulated. At its lower end the plunger is provided with the reduced portion or neck 42, which produces below it the portion 43 of the same diameter as the main body of the plunger, shoulders 44 being thus provided at opposite ends of the neck 42. At its lower end the plunger is provided with the conical or bevel portion 45, which converges to a centrally-disposed pin 46 at the extreme lower end of the plunger. A spring 47 surrounds the plunger 40 and has its upper end in engagement with the head 41 of the plunger and its lower end in engagement with the upper end of the reduced part 5 of the body portion 1. (See Figs. 1, 2, and 4.)

48 is a screw which passes through the slot 23 in the sheath 21, screws into the aperture 20 in the body portion 1, and has its smooth reduced end projecting into the space in the plunger 40, provided between the shoulders 44 and produced by the neck 42. Thus the smooth end of the screw 48 limits the movement of the plunger within the body portion 1, is held in place by screwing into the body portion, and has its head located in the elongated slot 23 of the sheath 21, the said head thus limiting the movement of the body portion 1 relatively to the sheath 21, as will be hereinafter described.

A screw 49 enters the sheath 21 and its head projects so as to guide and retain the collar 31 by operating within the slots 33 and 34 of said collar.

In the bottom plan view of Fig. 5 it will be seen that the cross-bar 26 is provided centrally in its bottom with a conical depression 50, this being for the reception of the ends of the shafts, pins, or pivots of the various parts which are to be lifted or extracted. In this view it will also be seen that the fingers 6 and 7 are formed with grooves 51 in their adjacent ends, which enable them to embrace the shafts, pins, &c., of the various portions; but it will be understood that the ends of these fingers may be given any other form suitable for properly engaging and holding the various parts to be operated upon. The spring 47 is much stronger and stiffer than the spring 30, said spring 47 normally holding the plunger in its highest position with the inner end of the screw 48 in engagement with the lower one of the shoulders 44 on the plunger. The spring 30 has ordinarily sufficient strength to easily lift any article grasped by the fingers 6 and 7.

Having thus described the details and structure of my invention, I will now set forth the operation of the same.

Primarily it should be understood how the parts are brought into proper coöperative relation and are operatively assembled. The fingers 6 and 7 having been properly secured

to the body portion 1 and the springs 13 and 14 set in place to bear upon and hold the fingers in the normal position, (shown in Figs. 1, 3, and 4,) the sheath 21 is slid down over the body portion 1 until the flange 22 comes in contact with the shoulder 4, the slot 23 being made to register with the aperture 20. The cross-bar 26 is then secured in place. Next the collar 31 is slid onto the sheath 21. Then the spring 30 is slipped over the screw-threaded part 5 of the body portion 1 and set upon the flange 22 of the sheath 21. Next the adjusting-nut 38 is screwed upon the part 5 of the body portion 1. Then the plunger 40 is slid within the body portion 1 until its lower end contacts with the extensions 11 and 12 of the holding-fingers, the spring 47 having previously been placed upon the plunger. Now by properly positioning the parts on each other the screw 48 can be set until its smooth end enters the space at the neck 42 of the plunger and its head is housed within the slot 23 of the sheath 21. This prevents the plunger from being removed and causes the spring 47 to be held under compression between the upper end of the part 5 of the body portion and the head 41 of the plunger. By now adjusting the collar 31 upon the sheath 21 the screw 49 can be set in place so that its head will operate within the slots 33 and 34, thus enabling the said collar to be adjusted vertically on the sheath 21 and prevent its removal therefrom. It will now be seen that the implement is capable of several adjustments—that is to say, the collar 31 can be adjusted to two extremes by first turning the collar upon the sheath until the screw 49 is in the straight slot 33 and then either raising or lowering the collar on the sheath according to the desired position for the legs 32. By turning the adjusting-nut 38 one way or the other the downward movement and lower position of the body portion 1, and with it the movement and position of the holding-fingers 6 and 7 relatively to the lower ends of the legs 32, can be regulated and determined. Irrespective of the adjustment of these several parts the plunger 40 may be moved to its fullest extent, provided the relation of the fingers 6 and 7 and the legs 32 is such as to permit the full extent of the movement of said fingers. In other words, the legs may be in such position that when the plunger operates upon the extensions 11 and 12 to open the fingers 6 and 7 the latter may be limited in their movements by contact with said legs; but it will be understood that the plunger always has the capability of movement to its fullest extreme, and the legs may be formed so as not to impede or limit the movement of the fingers. If now the parts are adjusted as shown in Fig. 4, the operation will be as follows: The operator holds the implement between the thumb and second finger, with the first finger resting upon the head 41 of the plunger 40.

Pressure is now brought to bear upon the head 41, the spring 47 depressing the body portion 1 within the sheath 21, this being accomplished without independent movement of the plunger 40 within said body portion 1, because the spring 47 is sufficiently strong to first cause the compression of the spring 30 between the flange 22 of the sheath 21 and the adjusting-nut 38. This movement will continue until the compression of spring 30 gives the same sufficient resistance to overcome the normal strength of spring 47 or until nut 38 contacts with sheath 21 or the screw 48 engages the lower end of slot 23 in the sheath. This condition can be controlled and regulated by the nut 38, if the spring 30 is sufficiently strong, so as to be obtained or reached at substantially any plane desired; but in either event the fingers will have reached their lower limit, for continued pressure upon the head 41 of the plunger 40 will then cause compression of the spring 47 and movement of the plunger longitudinally within the bore 19 of the body portion 1, and until the pin 46 and inclined or conical portion 45 at the lower end of the plunger have spread the fingers 6 and 7 to the extent permitted by the legs 32 or until the upper shoulder 44 engages the inner end of screw 48 by forcing apart the extending portions 11 and 12. If the collar 31 is adjusted as shown in Fig. 1, the parts, according to the operation just described, will be in the position of Fig. 2; but if the collar be adjusted to its higher position, with screw 49 in the lower slot 34, the fingers 6 and 7, according to the operation just described, will be projected considerably below the pads 35. In either event and according to the operation just described the fingers 6 and 7 are first bodily moved into a position where they can properly engage the part which is to be lifted and are then spread apart preparatory to gripping said part. The jaws being now positioned and opened, as in Fig. 2, the legs 32 are brought into a position of rest upon a given surface without undue pressure, and by lifting the finger from the head of the plunger the spring 47, being the stronger and being under strong compression, will instantly lift the plunger and permit the springs 13 and 14 to quickly and firmly close the fingers 6 and 7 upon the part to be lifted. The plunger having been forced to its upper extreme position by the spring 47, the spring 30 will take control and lift the body portion 1 within the sheath 21, thus bodily lifting the fingers 6 and 7, together with the part which is tightly gripped between them. If the spring 30 is found to be too light to lift the part, the nut 38 can be turned so as to force the body portion vertically and lift the fingers and the part grasped thereby, and this manipulation is sometimes desirable to avoid risk of losing parts by flying off. By adjusting the collar and the body portion 1 the fingers 6 and 7 can be positioned

so as to lift the hands of a watch or other parts which lie close to a surface with ease and certainty or so as to lift parts which are more or less above a surface. Thus it will
 5 be seen that without any effort on the part of the operative or the use of unwieldy and bulky instruments the most delicate parts can be properly engaged, lifted, and manipulated by the mere movement of the first finger of
 10 the hand of the operative.

From the above description it will be obvious that I have produced an implement or pair of lifting-tongs which can be used for manipulating the most delicate parts of a watch or
 15 other article, which is certain and easy of action and operation, and which is an immense aid on occasions when one's hand is inclined to be unsteady.

Having thus described my invention, what
 20 I claim, and desire to secure by Letters Patent is—

1. Lifting-tongs for the purpose described, having in combination a longitudinally-movable body portion, gripping-fingers carried
 25 thereby, means for normally holding the gripping-fingers closed, and means for opening the gripping-fingers when the body portion reaches one extreme of its longitudinal movement.

30 2. Lifting-tongs for the purpose described, having in combination a longitudinally-movable body portion, gripping-fingers pivotally carried thereby, means for normally holding the gripping-fingers closed, and means for
 35 opening the gripping-fingers when the body portion reaches one extreme of its longitudinal movement.

3. Lifting-tongs for the purpose described, having in combination a body portion carrying
 40 spring-controlled, normally closed gripping-fingers, means for depressing the fingers, and means for actuating the fingers to open the same against the spring-pressure.

4. Lifting-tongs for the purpose described,
 45 having in combination a longitudinally-movable body portion, gripping-fingers carried thereby, means for normally closing the gripping-fingers, and means for bodily lifting the gripping-fingers.

50 5. Lifting-tongs for the purpose described, having in combination a longitudinally-movable body portion, gripping-fingers pivotally supported thereby, means for normally closing the gripping-fingers, and means for bodily
 55 moving the gripping-fingers into and out of gripping position.

6. Lifting-tongs for the purpose described, having in combination a body portion longitudinally bored, gripping-fingers pivotally
 60 connected to one end of the body portion, means for normally closing the fingers, a plunger located in the bore, means whereby the plunger may be reciprocated in the body portion, and means carried by the plunger for
 65 positively spreading the fingers.

7. Lifting-tongs for the purpose described, having in combination a body portion, gripping-fingers pivoted thereto, means for normally pressing the fingers yieldingly together, means for spreading the fingers apart, means
 70 carried by the body portion and movable longitudinally thereof affording a support for the tongs, and means for regulating the position of the fingers relatively to the support.

8. Lifting-tongs for the purpose described,
 75 having in combination a body portion, gripping-fingers pivotally supported thereby, means for actuating the fingers, means independent of the body portion and movable relatively thereto for supporting the tongs, and
 80 means for adjusting the fingers relatively to the support.

9. Lifting-tongs for the purpose described, having in combination a body portion, gripping-fingers carried thereby, means for actuating the gripping-fingers, means for supporting the tongs, and means whereby the body
 85 portion may be reciprocated relatively to the support.

10. Lifting-tongs for the purpose described,
 90 having in combination a body portion, gripping-fingers carried thereby, means for actuating the gripping-fingers, means for supporting the tongs, means for reciprocating the fingers relatively to the support, and means
 95 for reciprocating the body portion relatively to the support.

11. Lifting-tongs for the purpose described, having in combination a body portion, gripping-fingers pivoted thereto, means for actuating the gripping-fingers, a support for the
 100 tongs, means for reciprocating the body portion relatively to the support, means for reciprocating the fingers relatively to the body portion, and means for regulating the position
 105 of the fingers relatively to the support.

12. Lifting-tongs for the purpose described, having in combination a body portion, gripping-fingers carried thereby, means for normally closing the gripping-fingers, a cross-bar
 110 fixed in position on the body portion for co-operating with the gripping-fingers to lift a given article, and means for supporting the tongs.

13. Lifting-tongs for the purpose described,
 115 having in combination a body portion, gripping-fingers carried thereby, means for actuating the gripping-fingers, a support carried by the body portion, and means for adjusting the support on said body portion.
 120

14. Lifting-tongs for the purpose described, having in combination a body portion, gripping-fingers carried thereby, a spring-supported plunger carried by the body portion,
 125 means on the plunger for positively spreading the fingers, and means acting in opposition to the plunger to close the fingers.

15. Lifting-tongs for the purpose described, having in combination a body portion, gripping-fingers carried thereby, a plunger car-
 130

ried by the body portion, a spring supporting the plunger on the body portion, a support for the tongs, and means interposed between the support and the body portion whereby the body portion may be reciprocated independently of the support.

16. Lifting-tongs for the purpose described, having in combination a body portion, gripping-fingers carried thereby, means for actuating the gripping-fingers, a sheath carried by the body portion, a support for the tongs, means between the sheath and the body portion for actuating the latter independently of the means for actuating the fingers.

17. Lifting-tongs for the purpose described, comprising a support, a body portion movable longitudinally relatively to the support, gripping-fingers carried by the body portion, means for actuating the gripping-fingers comprising a spring-controlled plunger, means for adjusting the position of the support relatively to the fingers, and means for adjusting the body portion relatively to the support.

18. Lifting-tongs for the purpose described, comprising a support, a body portion, gripping-fingers pivotally supported thereby, means for actuating the fingers including a spring-controlled plunger, and means for supporting the body portion relatively to the support including a spring, the tensile strength of the plunger-spring being greater than that of the body-supporting spring.

19. Lifting-tongs for the purpose described, comprising a body portion carrying pivoted fingers and having means for actuating the fingers, a sheath supporting a cross-bar which coöperates with the fingers, a collar having supporting-legs, and means for adjusting the collar relatively to the sheath and body portion.

20. Lifting-tongs for the purpose described, comprising a body portion carrying pivotally-supported spring-controlled gripping-fingers, a sheath surrounding the body portion and carrying a cross-bar which coöperates with the fingers, a collar carried by the sheath having legs for supporting the tongs, a plunger for actuating the fingers, a spring between the plunger and the body portion, and a spring between the body portion and the sheath.

21. Lifting-tongs for the purpose described, comprising a support, gripping-fingers carried thereby and movable longitudinally thereof, means for yieldingly holding said fingers normally closed, and means whereby the fingers may be moved longitudinally relatively to the support and subsequently opened to engage the article to be lifted.

22. Lifting-tongs for the purpose described,

comprising a support, gripping-fingers carried thereby and movable longitudinally thereof, means for normally holding the fingers retracted relatively to the support and also closed, and means whereby the fingers may be moved bodily from retracted position and subsequently opened.

23. Lifting-tongs for the purpose described, comprising a support, gripping-fingers carried thereby and movable longitudinally thereof, means for normally holding the fingers retracted relatively to the support and also closed, means whereby the fingers may be moved bodily from retracted position and subsequently opened, and means for regulating the extent of bodily movement of the fingers.

24. Lifting-tongs for the purpose described, comprising a support, gripping-fingers carried thereby and movable relatively thereto, means for normally holding the fingers retracted relatively to the support and also closed, means whereby the fingers may be moved bodily from retracted position and subsequently opened, and means for regulating the extent of the spread of the fingers.

25. Lifting-tongs comprising a support, gripping-fingers carried thereby and movable relatively thereto, means for normally holding said fingers retracted relatively to the support and also closed, means whereby the fingers may be moved bodily from retracted position and subsequently opened, and means for regulating the bodily movement of the fingers and proportionately regulating the spread of the latter.

26. Lifting-tongs comprising supporting means, gripping-fingers carried by the support, means whereby the fingers may be bodily reciprocated relatively to said support and normally held retracted, and independent means whereby the fingers may be oscillated and normally held closed.

27. Lifting-tongs substantially as described, having in combination normally closed gripping-fingers, means for supporting and normally maintaining said fingers retracted, means for bodily moving said fingers from retracted into gripping position, means for spreading the fingers after they have reached gripping position, and means for supporting the entire instrument.

In testimony whereof I have hereunto signed my name in the presence of two subscribing witnesses.

CARL WILHELM ZIPPERER.

Witnesses:

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