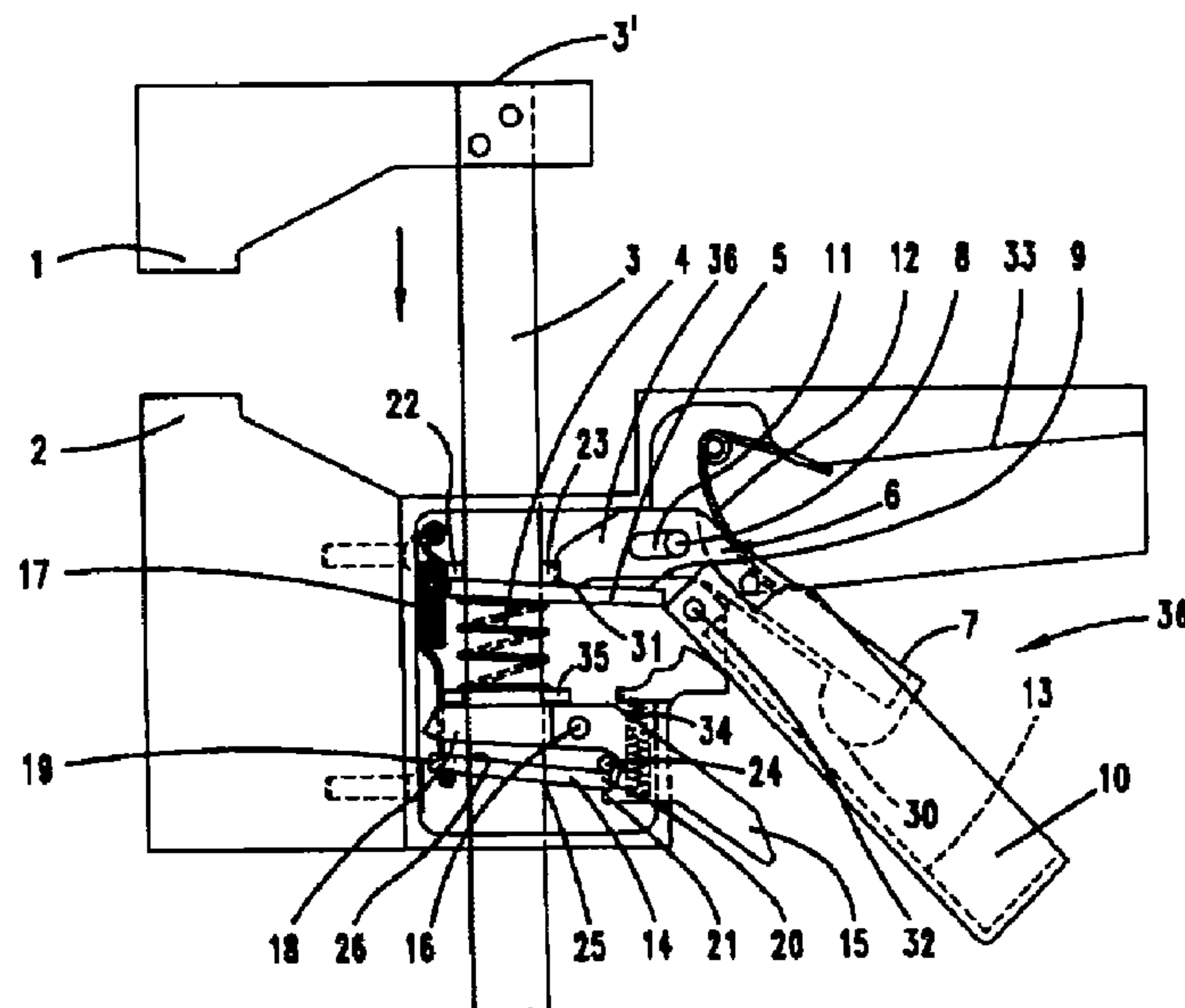


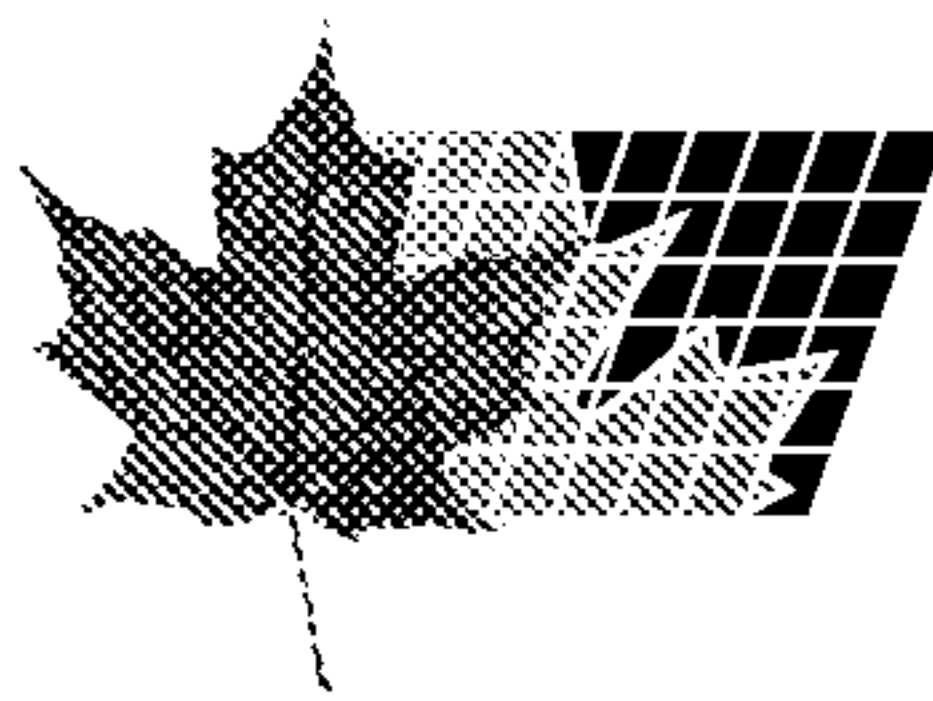


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(54) **OUTIL DE SERRAGE, EN PARTICULIER SERRE-JOINT, BLOC
DE SERRAGE OU TABLE DE SERRAGE**
(54) **CLAMPING TOOL, ESPECIALLY A CLAMPING CLIP,
CLAMPING ROD OR CLAMPING BENCH**



(57) L'invention concerne un outil de serrage, en particulier un serre-joint comportant une zone de serrage comprise entre une première mâchoire de serrage (1), qui est mobile et repose à l'extrémité d'une barre de traction ou de coulissement, et une seconde mâchoire de serrage (2), qui est fixe et repose sur un boîtier. Ledit outil de serrage comporte également une manette (10) oscillante placée, par rapport au sens longitudinal de la barre de traction, à l'opposé de la mâchoire de serrage (2) fixe et

(57) The invention relates to a clamping tool, especially a clamping clip with a clamping area between a first mobile clamping jaw (1) which rests at the end of a pull or slide rod and a fixed second clamping jaw (2) which rests on a housing. The inventive clamping tool also comprises a pivoting handle (10). Said handle (10) is located opposite the fixed clamping jaw (2) in relation to the longitudinal extension of the pull rod and next to a grip situated on the housing side. As the handle (10) is



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à côté d'une poignée qui est située du côté boîtier. Lorsque l'on amène ladite manette contre la poignée, la barre de traction peut être déplacée pas à pas, en étant maintenue par une contre-pression, de telle sorte que la première mâchoire de serrage, mobile, est déplacée en direction de la seconde mâchoire de serrage, fixe. Cet outil comprend également un levier de libération placé sur le boîtier et servant à éliminer le blocage par contre-pression. Pour que le champ d'utilisation de ce serre-joint soit élargi, il est prévu qu'aussi bien la manette (10) que le levier de libération (15) soient disposés sur le côté de la poignée (33) opposé à la zone de serrage (1, 2), que les rapports de transmission du levier se modifient lorsque la force de serrage augmente, pour donner des courses de déplacement plus petite, et que la mâchoire de serrage mobile puisse être ramenée à son point de départ pas à pas, par actionnement du levier de libération (15).

displaced against the grip, the pull rod is displaced progressively in such a way that the first mobile clamping jaw is moved towards the second fixed clamping jaw, any back pressure being locked. The clamping tool also has a release lever for releasing the back pressure lock. This release lever rests on the housing. In order to increase the scope of application of the inventive clamping clip, both the handle (10) and the release lever (15) are located on the side of the grip (33) facing away from the clamping area (1, 2), the lever transmission ratios are adjusted as the clamping force increases for smaller displacement paths and the mobile clamping jaw can be moved back progressively by operating the release lever (15).





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(21) Internationales Aktenzeichen: PCT/EP98/03915 (22) Internationales Anmeldedatum: 26. Juni 1998 (26.06.98) (30) Prioritätsdaten: 197 31 579.8 23. Juli 1997 (23.07.97) DE (71) Anmelder (für alle Bestimmungsstaaten ausser US): WOLFCRAFT GMBH [DE/DE]; Wolffstrasse, D-56746 Kempenich (DE). (72) Erfinder; und (75) Erfinder/Anmelder (nur für US): BLANK, Stefan [DE/DE]; Bornberg 5, D-56567 Neuwied (DE); NONIEWICZ, Zbigniew [DE/DE]; An der Hardt 22, D-56746 Kempenich (DE). DEGEN, Klemens [DE/DE]; Zur Geisley 8, D-56745 Weibern (DE). SCHÜLLER, Hans-Jürgen [DE/DE]; Schulstrasse 5, D-53426 Königsfeld (DE). (74) Anwälte: GRUNDMANN, Dirk usw.; Corneliusstrasse 45, D-42329 Wuppertal (DE).		(81) Bestimmungsstaaten: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, GM, GW, HU, ID, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZW, ARIPO Patent (GH, GM, KE, LS, MW, SD, SZ, UG, ZW), eurasisches Patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), europäisches Patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI Patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG). Veröffentlicht <i>Mit internationalem Recherchenbericht. Vor Ablauf der für Änderungen der Ansprüche zugelassenen Frist; Veröffentlichung wird wiederholt falls Änderungen eintreffen.</i>

(54) Title: CLAMPING TOOL, ESPECIALLY A CLAMPING CLIP, CLAMPING ROD OR CLAMPING BENCH

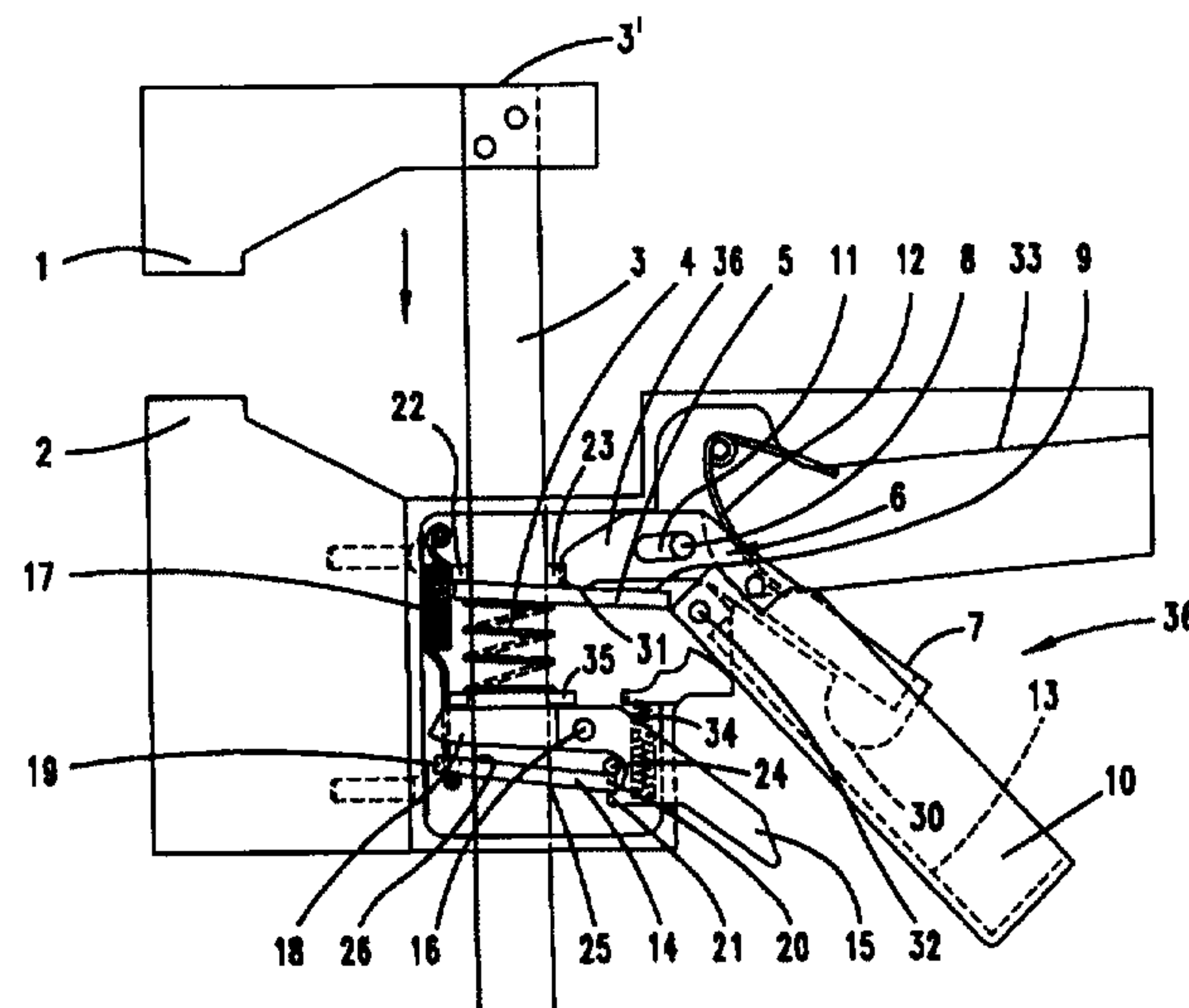
(54) Bezeichnung: SPANNWERKZEUG, INSBESONDERE SPANNZWINGE, SPANNSTOCK ODER SPANNTISCH

(57) Abstract

The invention relates to a clamping tool, especially a clamping clip with a clamping area between a first mobile clamping jaw (1) which rests at the end of a pull or slide rod and a fixed second clamping jaw (2) which rests on a housing. The inventive clamping tool also comprises a pivoting handle (10). Said handle (10) is located opposite the fixed clamping jaw (2) in relation to the longitudinal extension of the pull rod and next to a grip situated on the housing side. As the handle (10) is displaced against the grip, the pull rod is displaced progressively in such a way that the first mobile clamping jaw is moved towards the second fixed clamping jaw, any back pressure being locked. The clamping tool also has a release lever for releasing the back pressure lock. This release lever rests on the housing. In order to increase the scope of application of the inventive clamping clip, both the handle (10) and the release lever (15) are located on the side of the grip (33) facing away from the clamping area (1, 2), the lever transmission ratios are adjusted as the clamping force increases for smaller displacement paths and the mobile clamping jaw can be moved back progressively by operating the release lever (15).

(57) Zusammenfassung

Die Erfindung betrifft ein Spannwerkzeug, insbesondere Spannzwinde, mit einer Spannzone zwischen einer beweglichen, am Ende einer Zug-/Schubstange sitzenden ersten Spannbacke (1) und einer festen, an einem Gehäuse sitzenden zweiten Spannbacke (2), mit einer in bezug auf die Zugstangenlängserstreckung der festen Spannbacke (2) gegenüberliegend und neben einem gehäuseseitigen Handgriff angeordneten, schwenkbaren Handhabe (10) durch deren Verlagerung gegen den Handgriff die Zugstange schrittweise derart rückdrückgesperrt verlagerbar ist, daß die bewegliche erste Spannbacke auf die feste zweite Spannbacke zu bewegt wird, und mit einem am Gehäuse sitzenden Freigabehebel zum Aufheben der Rückdrücksperrung. Zur Erweiterung des Anwendungsspektrums der Spannzwinde ist vorgesehen, daß sowohl die Handhabe (10), als auch der Freigabehebel (15) auf der der Spannzone (1, 2) abgewandten Seite des Handgriffes (33) liegen und daß sich die Hebelverhältnisse der Hebelübertragung bei zunehmender Spannkraft hin zu kleineren Verlagerungswegen ändert und daß die bewegliche Spannbacke durch Betätigung des Freigabehebels (15) schrittweise zurückverlagerbar ist.



- 1 -

The invention relates to a clamping tool according to
5 the preamble of Claim 1.

A clamping tool of the type in question in the form of
a clamp is known from German Patent Application DE 39
17 473. This known clamp has a movable clamping jaw
10 which is fitted at the end of a push rod. This clamping
jaw engages through a housing which carries a second,
fixed clamping jaw. A grip projects from the housing.
By means of a handle, which is arranged pivotably on
the housing and can be moved towards the grip, the push
15 rod can be displaced such that the movable clamping jaw
is moved in a stepwise manner towards the fixed
clamping jaw. On the handle side, in the direction of
the two clamping jaws, the previously known clamp has a
releasable detent against reverse displacement, in the
20 form of a clamping lever. This is intended to prevent
the movable clamping jaw from being able to be
displaced in the opposite direction. A free end of the
lever forming the return displacement detent projects
out of the housing there and can be pivoted in order to
25 release the return displacement detent. In the released
position, the two clamping jaws can be moved apart in
opposite directions. The plane which is defined by the
jaw surface of the fixed clamping jaw and runs
substantially transversely to the direction of extent
30 of the push rod is located directly in front of the
free end of the lever of the return displacement detent
lever. This results, in the case of unfavourable
spatial conditions, in the position of the workpiece
located in the said plane adversely affecting actuation
35 of the lever. Furthermore, in the case of a clamp of
this kind, the fact that the free end of the push rod
can be displaced rearwards in a stepwise manner in
relation to the grip upon actuation is disadvantageous.
If the clamp is used, for example, in such a manner

that the clamping-jaw plane is located in the horizontal, and if the clamp is to be placed in position from above, then the free push-rod end projects upwards into the space in a disruptive manner.

5 Although this clamp allows use in a large number of clamping circumstances, reliable release of the clamping jaws is not guaranteed in specific clamping circumstances, in particular in the abovementioned clamping circumstances. There is also only a small
10 actuating path available for the clamping lever.

From American Patent 3,427,016, a further clamp is known. In this, a rotatable, toothed rod is fitted parallel to the push rod and has one end of a pivotable
15 handle engaging in it. The two clamping jaws can be moved towards one another by engagement in the teeth. In this case, the two clamping jaws are located to the rear of the actuating handle. Although a catch is fitted in the housing, the catch acting as return
20 displacement detent, this is not itself intended to be releasable. In order to release the return displacement detent, the toothed rod has to be rotated by engagement on a lever fitted to the movable jaw. It is also the case with this clamp that the release of the return
25 displacement detent leaves room for improvement.

A clamp is also known from Utility Model 87 03 379.8. In this case, although the release lever of the return displacement detent is remote from the movable jaws,
30 the problem mentioned in the introduction arises if clamping surfaces located in the horizontal plane are to be clamped from above.

A further clamp is known from GB 21 78 689. The
35 handleability of this clamp corresponds approximately to that of Utility Model 87 03 379.8.

From US-A 2 688 351, a clamp is already known in which the pull rod, on one side, provides a tothing arrangement in which there engages a catch which can be displaced by a handle, the handle being displaceable
5 towards the grip, in order thus for the movable jaw, located at the end of the pull rod, to be displaced towards the fixed jaw, which is fitted to the housing. As detent against return displacement, this clamping tool has a second detent catch, which is encapsulated
10 in the housing, engages in the tothing arrangement by spring bias and, for rearward displacement of the movable clamping jaw, has to be displaced out of the tothing arrangement. This displacement is effected by transverse pivoting.

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The invention is based on the problem of developing a clamp of the type in question such that reliable release of the clamping is possible for all clamping circumstances, and that it can be placed in position in
20 a more functionally advantageous manner during clamping.

The object is achieved by the invention specified in Claim 1. Subsidiary claims provide advantageous
25 developments. According to the invention, it is provided first and foremost that a release lever acts on the return displacement detent, and that both the handle and the release lever are located on that side of the grip which is directed away from the clamping
30 zone between the two clamping jaws.

On account of this configuration, although the release lever is located in a position remote from the clamping zone, it is, at the same time, at a defined spacing
35 from that side of the workpiece which is directed towards the release lever. Even in unfavourable clamping circumstances in which that surface of the workpiece which is directed towards the release lever

extends beyond the push rod to the grip side or actuating-member side of the push rod, reliable actuation of the release lever is possible. On account of an aligned arrangement of the rear side of the grip in relation to the clamping surface of the fixed clamping jaw, this grip, in certain clamping operations, can even perform a workpiece-supporting function. Located between the rear side and the fixed clamping jaw is a rearwardly projecting slot from which the push rod projects. Since the handle is located between release lever and grip and the grip is located nearest the clamping zone or the workpiece, it is even possible for the handle to be used as a second grip for the purpose of actuating the release lever. For this purpose, in particular an approximately triangular clearance located between the handle and grip has proven advantageous. Furthermore, the handle actuation, directed counter to the push-rod displacement, makes for favourable pivoting of the release lever and handle on the housing. The pivot points for the two levers are located on the same side of the push rod, to be precise such that in order to actuate the release lever, rather than having to clasp the grip, all that is required is to clasp the handle projecting freely from the housing. The fixed clamping jaw is located on the opposite side of the pivot points or of the grip portions. It is advantageous if the release lever is associated with that end of the housing which is located opposite the fixed jaw.

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A second aspect of the invention relates to development of the release lever. The release lever is configured such that the first clamping jaw is displaced rearwards in a stepwise manner above the second clamping jaw by actuation of the release lever. This configuration ensures proper single-handed use of the clamping tool. In a preferred configuration, the return displacement detent has a slide which can be latched or clamped to

35

the pull or push rod. This slide can be displaced freely over the pull or push rod by the release lever counter to the force of a return spring. When actuation of the release lever is completed, the slide is then
5 displaced into a clamping or latching position and is displaced back by the return spring, the pull or push rod being carried along in the process. The return spring preferably acts on one side of the slide and thus produces, in the absence of counter-clamping or
10 counter-support of the opposite side, a tilted position. In order to be able to slidably displace the slide over the pull or push rod, it is advantageous if an arm of the release lever presses on the slide at the engagement end for the return spring in order to
15 release the detent action upon actuation. The release lever may, furthermore, form a stop for the opposite side of the slide, by means of which the opposite side of the slide can be pressed against a fixed stop. For this purpose, the release lever is of fork-like design
20 on the operating side. For this stepwise rearward displacement of the push rod, it is advantageous if the release lever is actuated by a hand using the handle as a grip. The handle can be grasped by one hand since a clearance is provided between the grip and the handle,
25 running obliquely at an angle to the grip, and the clearance allows the actuating handle to be clasped. It is not then necessary for the hand to enclose the grip in order, for release-lever actuation, to be able to grasp a total of two levers, namely the handle as well.

30

A further aspect of the invention provides that the lever ratios of the lever transmission can be altered in a load-dependent manner. With increasing clamping force, which increases when a workpiece is clamped in
35 between the two clamping jaws, the lever ratios of the lever transmission alter to the effect that the path of displacement of the clamping jaw becomes smaller and thus, following the lever principle, the force which

can be applied is increased. The ratio between the operating arm and power arm of the lever transmission is variable, in favour of a clamping force which increases under load. The altered lever ratios are preferably realized in that the operating arm, which acts on the pull or push rod, is a shortenable arm of an actuating lever. The shortenable operating arm may then act on an engagement surface of the carry-along slide. In a preferred configuration, it is provided that the capacity for shortening the operating arm is achieved by the actuating lever providing an alterable bearing point. This alterable bearing point may be realized, for example, by the pivot mounting of the actuating lever being defined by a fixed bearing pin and the actuating lever being fitted to this bearing pin by way of a slot, with the result that the actuating lever can be displaced in a load-dependent manner. The slot then extends in the direction of extent of the lever. The actuating lever is preferably of two-armed design. If the first arm is formed by the operating arm, then the second arm may be pivotable by the handle. In a preferred configuration of the invention, it is provided that the operating arm is spring-biassed in the direction of engagement. In the case of increasing resistance, the operating arm presses on the biassed spring. When the spring loading is exceeded, it is possible for the operating arm to be displaced and thus shortened.

Three exemplary embodiments of the invention are explained hereinbelow with reference to the accompanying drawings, in which:

Fig. 1 shows a clamping tool according to the invention configured as a clamp, in a first, non-clamping position;

Fig. 2 shows a follow-up illustration to Fig. 1 with the handle actuated, in the non-gripping state;

5 Fig. 3 shows an illustration with the handle partially actuated, the two clamping jaws having been moved together to the full extent with a work piece clamped in between;

10 Fig. 4 shows a follow-up illustration to Fig. 3 with the handle actuated further and the grip arm shortened;

15 Fig. 5 shows a follow-up illustration to Fig. 4, where, in the clamping state, the return displacement detent has been released;

20 Fig. 6 shows a follow-up illustration to Fig. 5, the clamping jaws moving apart by actuation of the return displacement detent in the release direction;

25 Fig. 7 shows a constructional variant in which the clamping tool is formed as a spreading-action clamp;

Fig. 8 shows a second exemplary embodiment of the invention; and

30 Fig. 9 shows a third exemplary embodiment of the invention.

35 The clamp has a first clamping jaw 1 and a second clamping jaw 2. The first clamping jaw 1 is fixedly connected to one 3' of the ends of the pull or push rod 3 by releasable connections, for example push-in connections, screws or the like. The clamping jaw 2 has a stepping-mechanism housing which has the push rod 3 passing through it.

The stepping-mechanism housing continues into a grip portion 33. Located at the starting region of the grip portion 33 is a pivot pin 32 about which a handle 10 can be pivoted from an angled spaced-apart position into an abutment position against the grip portion 33. Adjacent to the handle 10, an arm of a release lever 15 projects out of the mechanism housing, the lever being mounted in spring-biassed manner with respect to the housing by means of a compression spring 34. In the rest position, the operating arm 18 of the release lever 15 engages against a fixed stop 35. The operating arm 18 has a hole through which the pull or push rod 3 extends. Located parallel to the operating arm 18 of the release lever 15, which can be pivoted about the bearing pin 16, is a detent slide 14, at the engagement end 19 of which a return spring 17 engages and urges the detent slide 14 counter to the displacement direction of the pull or push rod 3. The opposite side 20 of the detent slide 14 rests, in the rest position, against a fixed stop 24.

The handle 10 has a cavity 13. The handle is configured in the form of a U in the region of the cavity 13. The second arm 7 of an actuating lever 6 engages in this cavity. The actuating lever 6 has an angled configuration and its second arm 36, which defines an operating arm, engages against an engagement surface 9 of a carry-along slide.

30

The carry-along slide 5, just like the detent slide 14, has an opening through which the pull or push rod 3 projects. Just like the corresponding opening of the detent slide 14, the opening of the carry-along slide 5 has edges in order to be able to tilt into engagement with the pull or push rod 3.

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In the rest position, the carry-along slide 5 is pressed against the stops 22, 23 by a compression spring 4, which has the pull or push rod passing through it and is supported on the stop 35, the pressing being effected in such a manner that the push rod 3 can slide freely through the opening of the carry-along slide 5. On account of the biasing of the carry-along slide and of the associated tilting into engagement with the narrow edges of the pull or push rod 3, a displacement of the push rod 3 is possible only in the direction of the arrow.

The slot 11, which is located approximately in the vertex of the obtuse-angled actuating lever 6, is located approximately in the direction of extent of the actuating lever 6 and has a stationary bearing pin 8 passing through it. Engaging on the side of the second arm is a biasing spring 12 which acts substantially in the direction of extent of the slot, to be precise such that the operating arm 36 has its longest length without any opposing force.

If the actuating handle 10, as is illustrated in Fig. 2, is displaced against the grip portion 33, then, on the one hand, the biasing spring 12 is subjected to stressing and, on the other hand, by virtue of the operating arm 36 being pivoted, the carry-along slide 5 has the arm end 31 engaging against its engagement surface 9 and is displaced counter to the compression spring 4. On account of the tilting 27, 28, in the case of this handle actuation, the pull or push rod 3 is displaced in the direction of the arrow.

If the handle is released, then the actuating lever 6 is displaced back. The spring 4 displaces the carry-along slide 5 rearwards into the rest position.

10

During this rearward displacement of the carry-along slide 5, the pull or push rod remains undisplaced since its displacement counter to the direction of the arrow is blocked on account of the detent slide 14 tilting into engagement 25, 26 with the pull or push rod 3. If, as is illustrated in Fig. 3, the two clamping jaws 1, 2 are moved together to the full extent, a workpiece 29 being clamped in between, then the force which is to be applied in order to displace the pull or push rod 3 relative to the clamping jaw increases. A greater force has to be applied by the handle 10. This force is transmitted to the actuating lever 6. The biasing of the spring 12 is overcome by the increasing force component in the direction of the slot 11, with the result that the slot 11 can slide over the bearing pin 8, which results in the lever arm 36 being shortened. Along with this, the continuation 30 slides in the cavity 13 of the handle. On account of this shortening of the lever length of the operating arm 36, a greater force can be applied to the engagement surface 9 by means of the constant lever arm of the handle 10, with the result that it is possible to achieve a greater clamping force between the two clamping jaws 1 and 2 for expenditure of the same force, but it is also ensured that, in force-free operation, a high step width is assured upon handle actuation.

The detent slide 14 can be displaced in the direction of the arrow relative to the housing by handle actuation, just as for the carry-along slide 5. The displacement of the detent slide 14 is effected by actuation of the release lever 15. The release lever 15 is located in front of the handle 10 such that it can be actuated by the fingers of one hand which is brought into the clearance between handle 10 and grip 33 and engages the handle 10 in a gripping manner. Release is thus also possible if the workpiece extends beyond the push rod 3 and is located directly in front of the grip

33, which is located in approximate alignment with the fixed jaw 2. In particular when the workpiece comes into abutment against the grip 33, which is possible, for example, when the clamp operates in the expanding function illustrated in Figure 7, it is no longer possible to enclose the grip. In the expanding function illustrated in Fig. 7, that peripheral edge of the grip 33 which extends in aligned prolongation with respect to the fixed clamping jaw 2 has even proven advantageous since it can serve as an additional abutment surface against a workpiece.

Despite access to the grip being adversely affected by such workpiece abutment, actuation of the handle 10 and of the release lever 15 is nevertheless possible without difficulty. The release lever 15 is located on the housing approximately diagonally opposite the fixed clamping jaw 2. It acts on the detent slide 14 such that, when the arm 18 of the release lever 15 engages against the detent slide 14, the tilted position is eliminated and the detent slide 14 can slide freely over the pull or push rod 3. For this purpose, the arm 18 engages on the engagement end 19 of the detent slide 14, the return spring 17 also engaging at this end. The return spring 17 is stressed by displacement of the detent slide 14 in the direction of the arrow. If the release lever 15 is released, then the return spring pulls the detent slide 14 at the engagement end 19 counter to the direction of the arrow. This single-sided loading of the release lever 15 causes tilting 25, 26 on the opposite sides of the opening in the detent slide 14. Together with this, the detent slide 14 is clamped on the pull or push rod 3, with the result that the push rod 3 is carried along by the return spring 17 counter to the direction of the arrow, with the result that the two clamping jaws 1, 2 are moved apart.

In the case of the expanding-function position illustrated in Fig. 7, the movable clamping jaw 1 is located at the opposite end 3" of the push rod 3.

5 The exemplary embodiment which is illustrated in Fig. 8 functions identically to the exemplary embodiment which is illustrated in Figs. 1 to 7, the only differences being that the housing is of a different shape and the return spring 17 is somewhat shortened. Here too, the
10 release lever 15, which can be pivoted about the bearing pin 16, is of fork-like form and provides a continuation 21 which defines a stop in order to press the opposite side 20 of the detent slide 14 against the fixed stop 24.

15 It is also the case in this version that the rear side of the grip 33 merges into a rearwardly jutting section from which the push rod 3 projects. As in the case of the embodiment illustrated in Figs. 1-7, the rearwardly
20 jutting section, which is adjacent to the push rod 3, is spaced apart from the release lever 15 to a lesser extent than the rear side of the grip 33.

Rather than just being used for a single-handed clamp,
25 the abovedescribed mechanism can be used on any type of vice and, in particular, on a clamping bench. For use on a clamping bench, it is provided that the clamping jaws, located on two parallel members, transversely to the members, are guided in the parallel direction
30 relative to the members and each member has a clamping mechanism as described above. Actuation can be effected here, in particular, by a foot pedal.

The exemplary embodiment which is illustrated in Fig. 9
35 is distinguished by a housing shape of attractive configuration. Here too, the pivot points of release lever 15 and handle 10 are located on the side opposite the clamping jaws 1, 2 and on the same side as the

levers 10, 15, which project out of the housing. Here too, grip 33, handle 10 and release lever 15 project separately and freely from the housing. While the grip 33 is located directly opposite the fixed clamping jaw, the release lever is located diagonally opposite the fixed clamping jaw. Here too, during clamping, the push rod or the movable jaw 1 is displaced in the direction counter to the actuating direction of the handle 10. This variant also allows the movable clamping jaw 1 to be mounted at the opposite end 3" of the push rod 3. In this position, the grip-forming arm 33, projecting from the housing, together with the fixed jaw 2, performs a supporting function.

15 All features disclosed are pertinent to the invention. The disclosure content of the associated/attached priority documents (copy of the prior application) is hereby also included in the disclosure of the application as to its full content, also for the purpose of including features of these documents in
20 claims of the present application.

CLAIMS

1. Clamping tool, in particular clamp, having a clamping zone between a movable, first clamping jaw (1), fitted at the end of a pull/push rod, and a fixed, second clamping jaw (2), fitted to a housing, having a handle (10) which is located opposite the fixed clamping jaw (2) in relation to the longitudinal extent of the pull rod and is arranged alongside a grip on the housing, displacement of the handle towards the grip making it possible for the pull rod and the movable clamping jaw, fitted at the end of the pull rod, to be displaced in a stepwise manner in the direction of the housing while return displacement is blocked by a detent member which is located on that side of the handle which is directed away from the grip, the displacement of the pull rod being such that the movable, first clamping jaw is moved towards the fixed, second clamping jaw, it being possible for the return displacement detent to be released by the detent member being pivoted in the direction of displacement of the pull rod, characterized in that both the handle (10) and a release lever (15) which releases the return displacement detent by pivoting towards the grip, are located on that side of the grip (33) which is directed away from the clamping zone (1, 2).
2. Clamping tool, in particular clamp, according to Claim 1, characterized in that the release lever (15) is fitted at that end of the housing which is located diagonally opposite the fixed jaw (2).
3. Clamping tool according to one of the preceding claims, characterized in that the rear side of the grip (33) is fitted to the housing approximately

in alignment with and opposite the fixed clamping jaw (2).

4. Clamping tool, in particular clamp, vice or
5 clamping bench, having a first clamping jaw (1)
and a second clamping jaw (2), it being possible
for the first clamping jaw (1), which is fitted on
a pull or push rod (3), to be displaced in a
stepwise manner in one direction relative to the
10 second clamping jaw (2) by means of a first lever
transmission acting on a carry-along slide which
can be displaced counter to the return force of a
spring (4), and having a releasable return
displacement detent, characterized in that the
15 lever ratios of the lever transmission alter, as
the clamping force increases, towards smaller
paths of displacement.
5. Clamping tool according to Claim 4, characterized
20 in that the lever transmission comprises a
shortenable operating arm (36) of an actuating
lever (6), which acts on an engagement surface (9)
of the carry-along slide.
- 25 6. Clamping tool according to Claim 5, characterized
in that the actuating lever (6) has an alterable
bearing point (8, 11).
7. Clamping tool according to one of Claims 4 to 6,
30 characterized in that the actuating lever (6) has
a bearing opening which is formed as a slot (11)
and through which a housing-mounted bearing pin
(8) passes.
- 35 8. Clamping tool according to one of Claims 5 to 7,
characterized in that the actuating lever (6) is
of two-armed design, and the second arm (7), which

is located opposite the operating arm (36), can be pivoted by a handle (10).

- 5 9. Clamping tool according to one of Claims 5 to 8, characterized in that the operating arm (36) is spring-biassed in the direction of engagement and shortens when the spring-biassing is exceeded.
- 10 10. Clamping tool according to one of Claims 5 to 9, characterized in that the actuating lever (6) is an angled lever, the displaceable bearing (8, 11) of which is located in the vertex of the angle.
- 15 11. Clamping tool according to one of the preceding claims, characterized in that the clamping jaw (1) can be selectively mounted at one of the two ends (3', 3'') of the pull or push rod.
- 20 12. Clamping tool according to one of Claims 5 to 11, characterized in that the second arm (7) of the actuating lever (6) is loaded by the spring (12) in the direction of change of the bearing point.
- 25 13. Clamping tool according to one of Claims 5 to 12, characterized in that the second arm (7) of the actuating lever (6) is slidably positioned by the spring (12) in a cavity (13) of the handle (10), the handle being formed as a lever.
- 30 14. Clamping tool, in particular clamp, vice or clamping bench, having a first clamping jaw (1) and a second clamping jaw (2), it being possible for the first clamping jaw (1), which is fitted on a pull or push rod (3), to be displaced in a
35 stepwise manner in one direction relative to the second clamping jaw (2) by means of a first lever transmission acting on a carry-along slide which can be displaced counter to the return force of a

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spring (4), and having a releasable return displacement detent which can be brought from a detent position into a sliding position by means of a release lever (15), characterized in that the first clamping jaw (1) can be displaced rearwards, counter to the clamping direction, in a stepwise manner relative to the second clamping jaw (2) by means of the lever transmission.

10 15. Clamping tool according to one of the preceding claims, characterized in that the return displacement detent comprises a slide (14) which can be latched or clamped to the pull or push rod, can be displaced freely over the pull or push rod (3) by the release lever (15) counter to the force of a return spring (17), and, in a clamping or latching position, can be displaced rearwards by the return spring (17), the pull or push rod (3) being carried along in the process.

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16. Clamping tool according to Claim 15, characterized in that the return spring (17) acts on one side of the slide (14) and, when the release lever (15) is not actuated, retains the slide (14) in the detent position.

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17. Clamping tool according to one of Claims 15 and 16, characterized in that an arm (18) of the release lever (15) engages on the engagement end (19) of the return spring (17) and releases the detent action upon actuation.

30

18. Clamping tool according to one of the preceding claims, characterized in that the detent slide (14) and/or the carry-along slide (5) each have an opening which is provided with edges (25, 26 and 27, 28, respectively), through which openings the push rod (3) projects, the slide, in its detent

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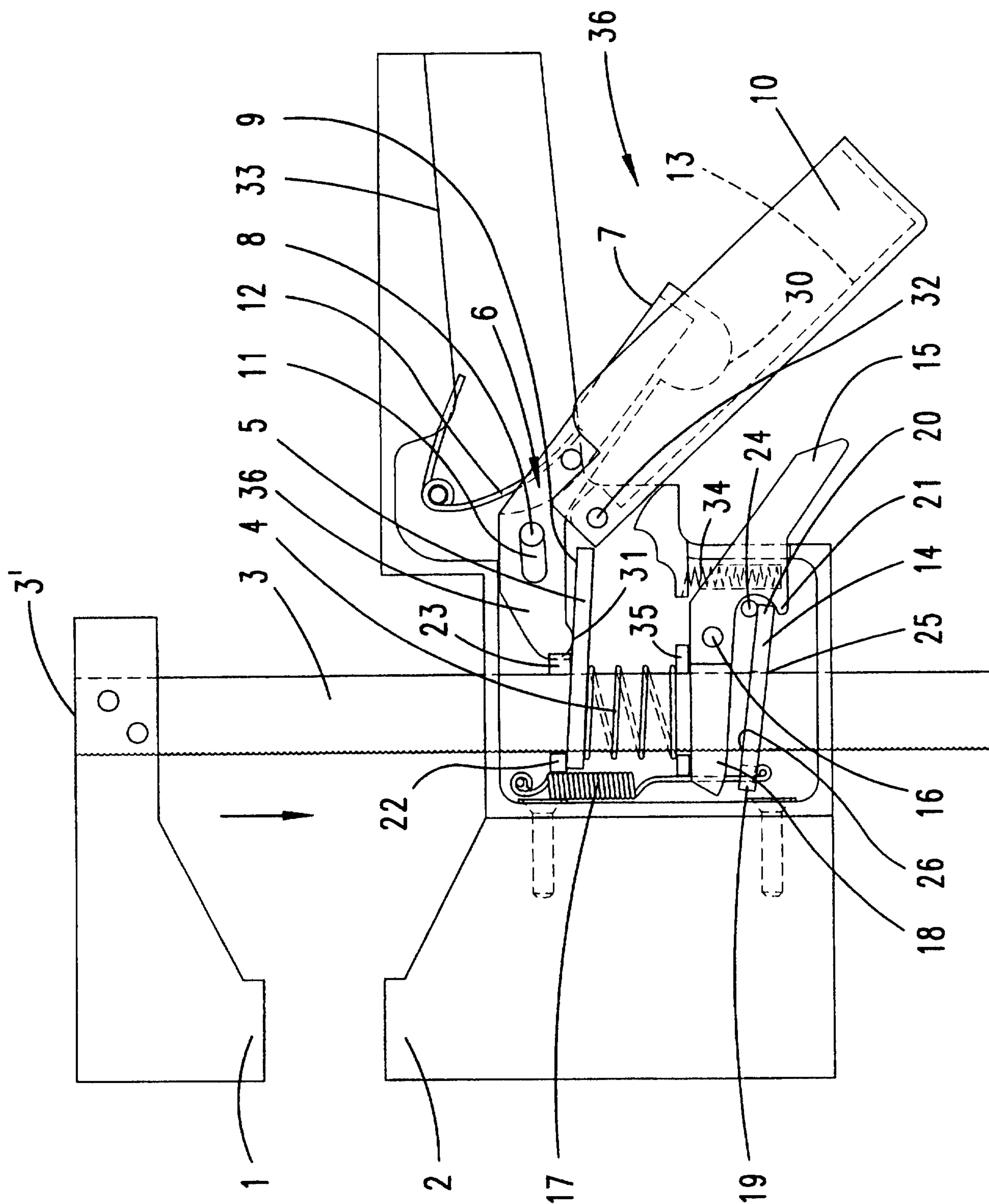
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position, being tilted into engagement with the narrow sides of the pull or push rod (3).

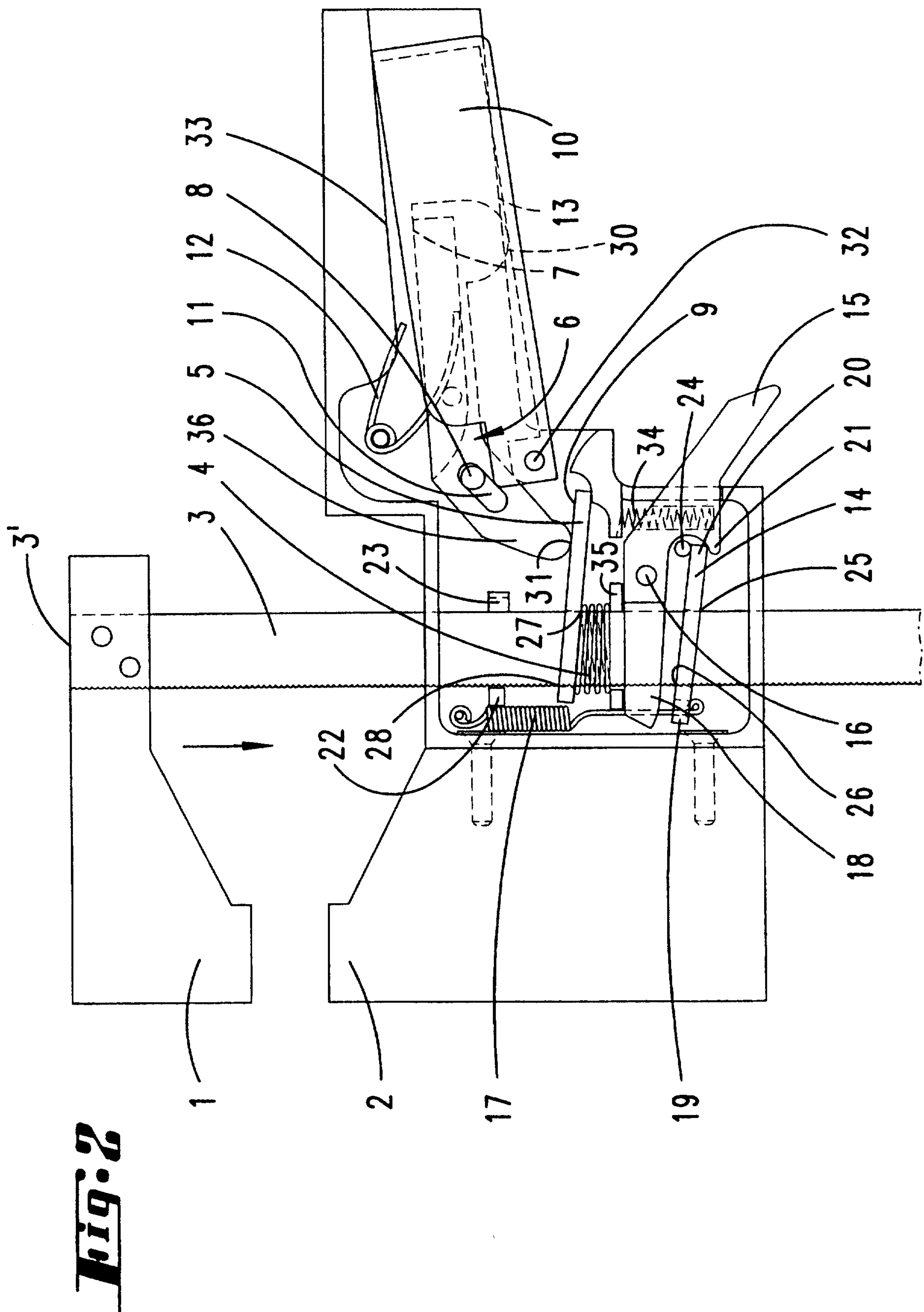
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Fig. 1



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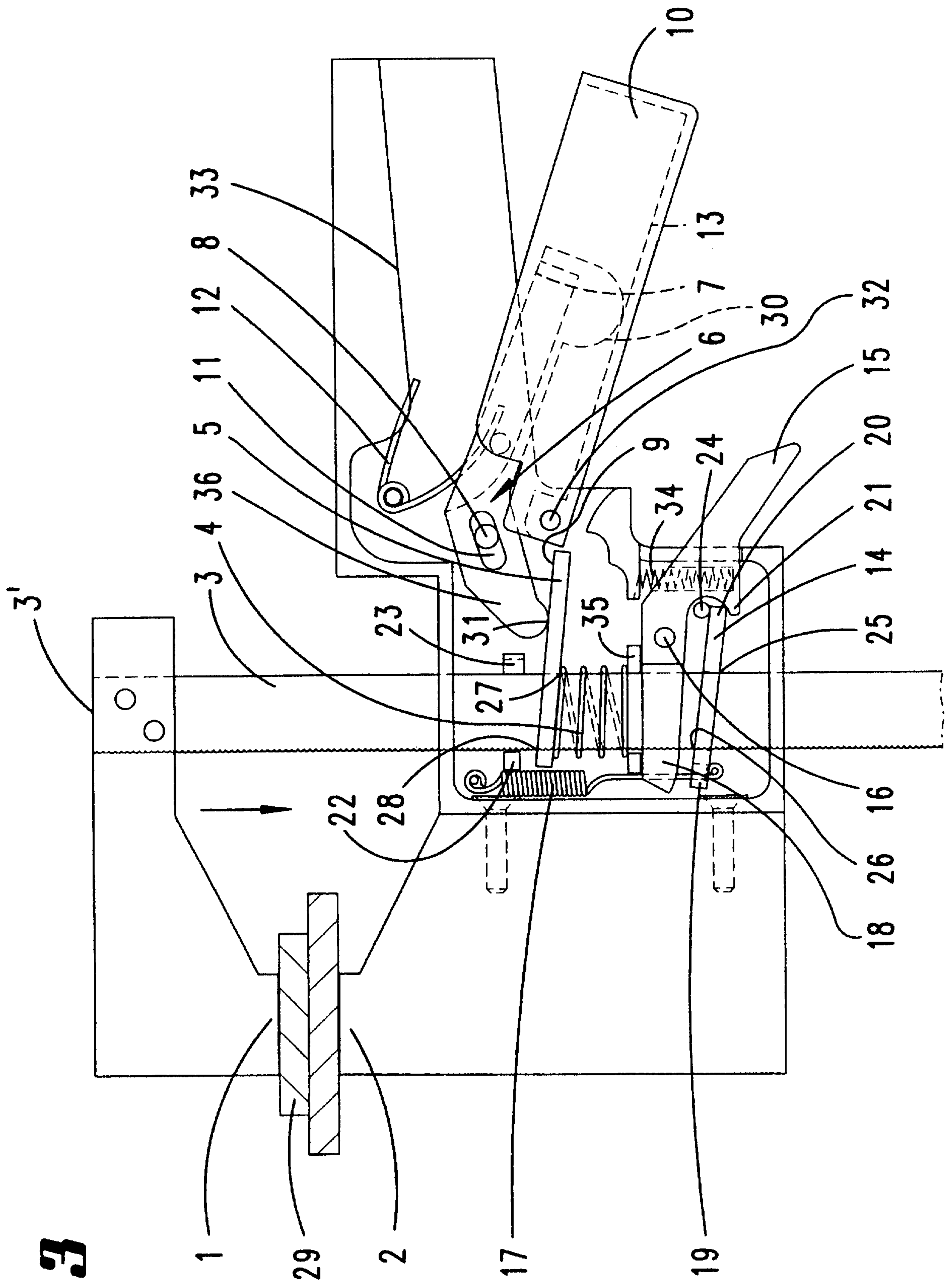


Fig. 3

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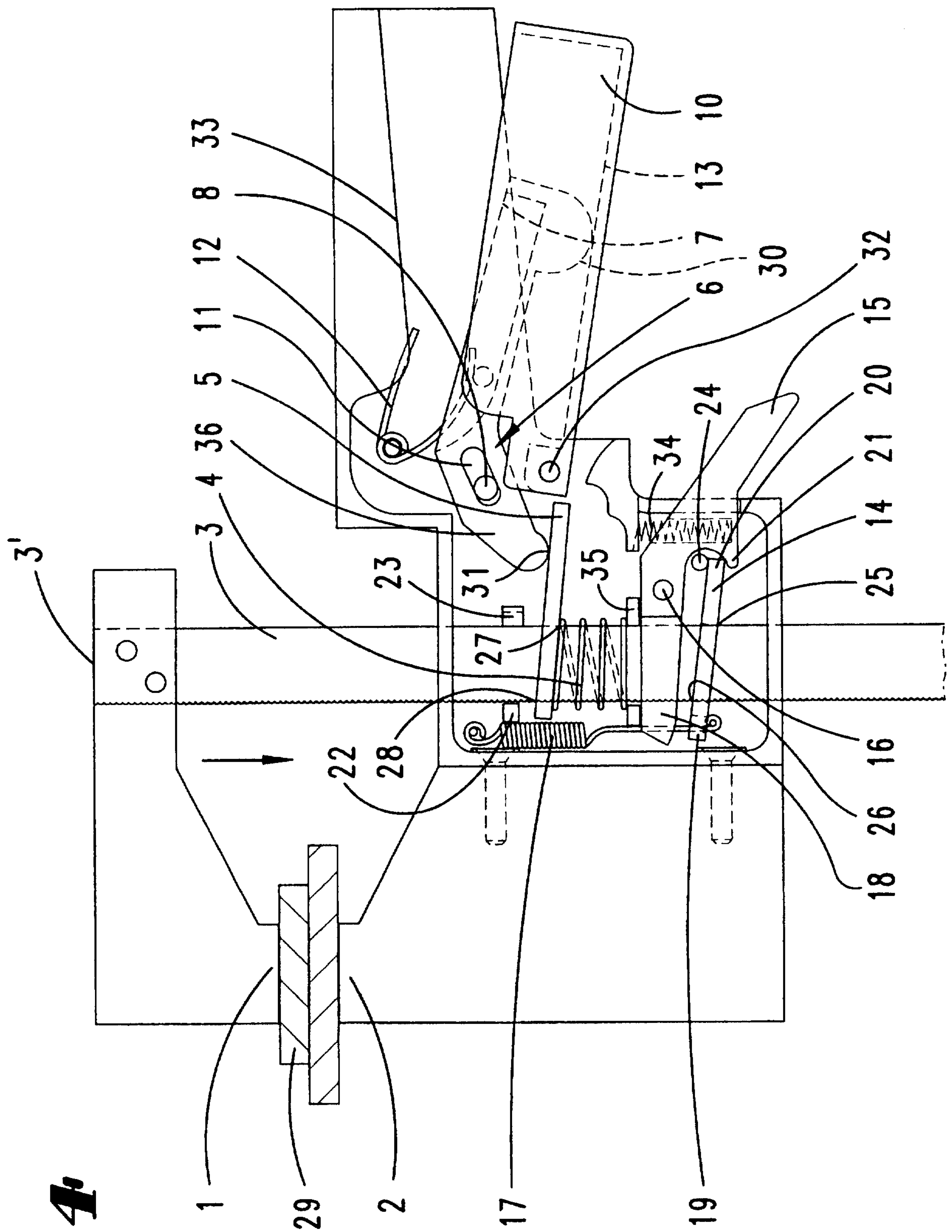
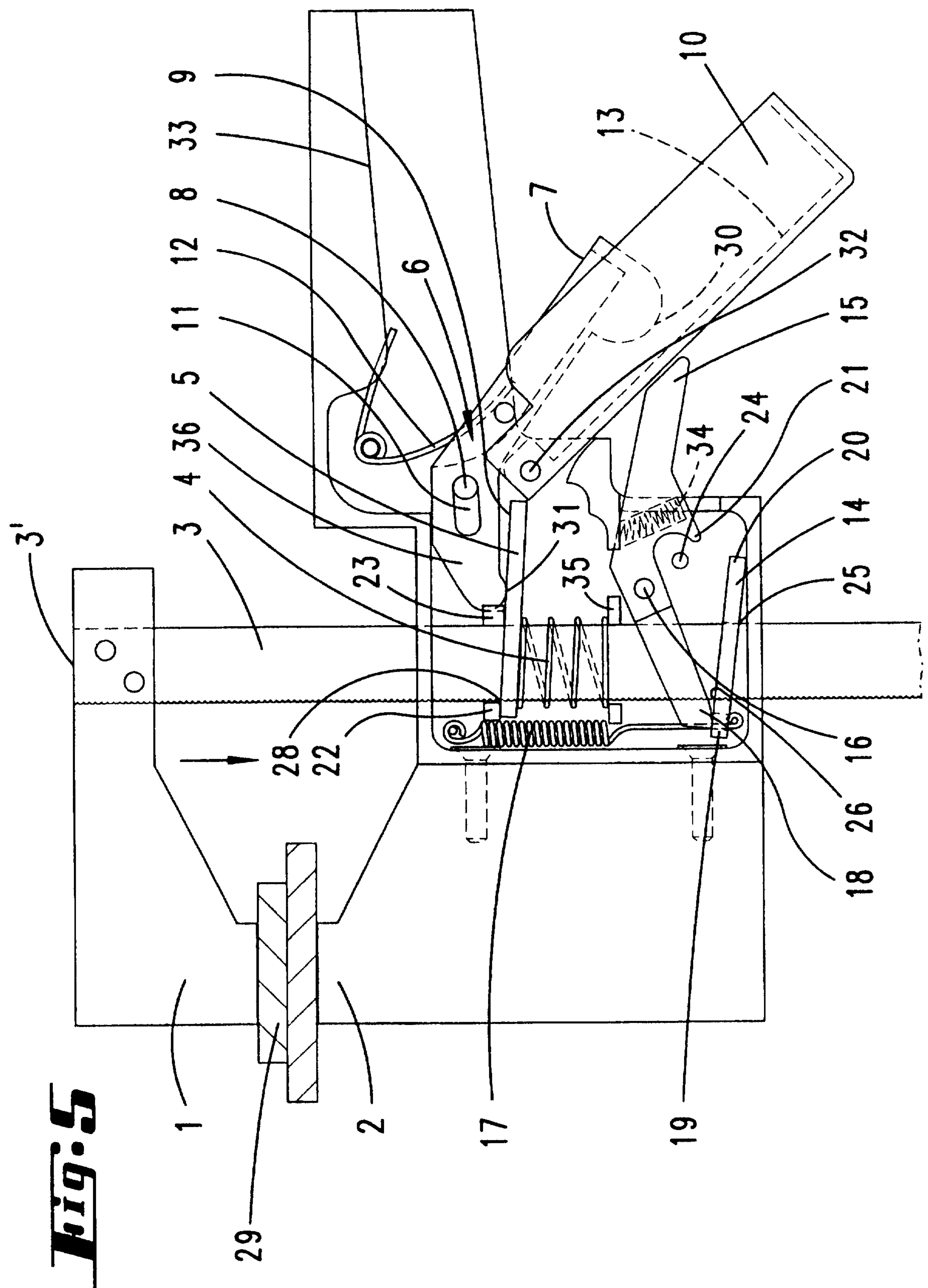
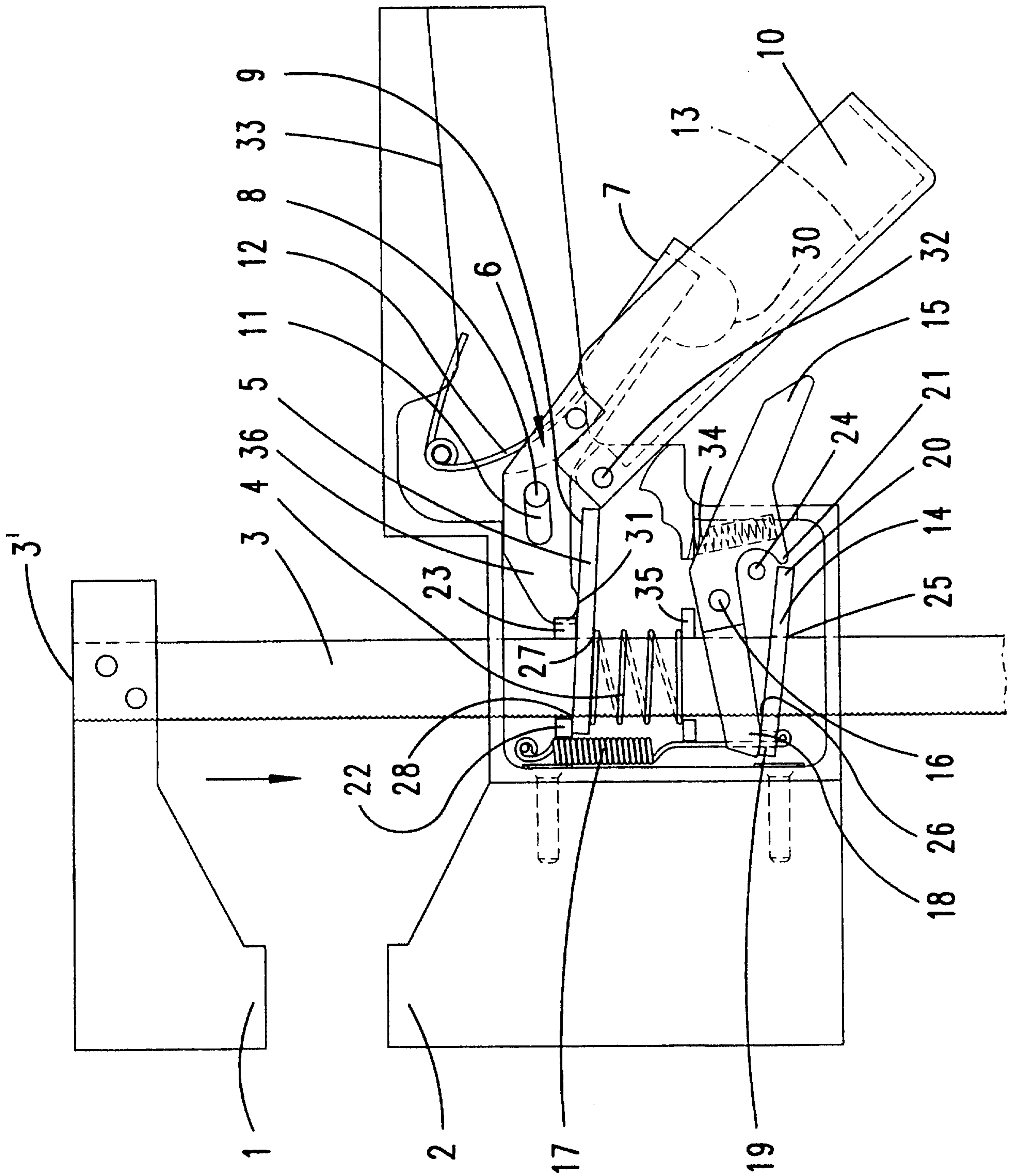


Fig. 4

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**Fig. 6**

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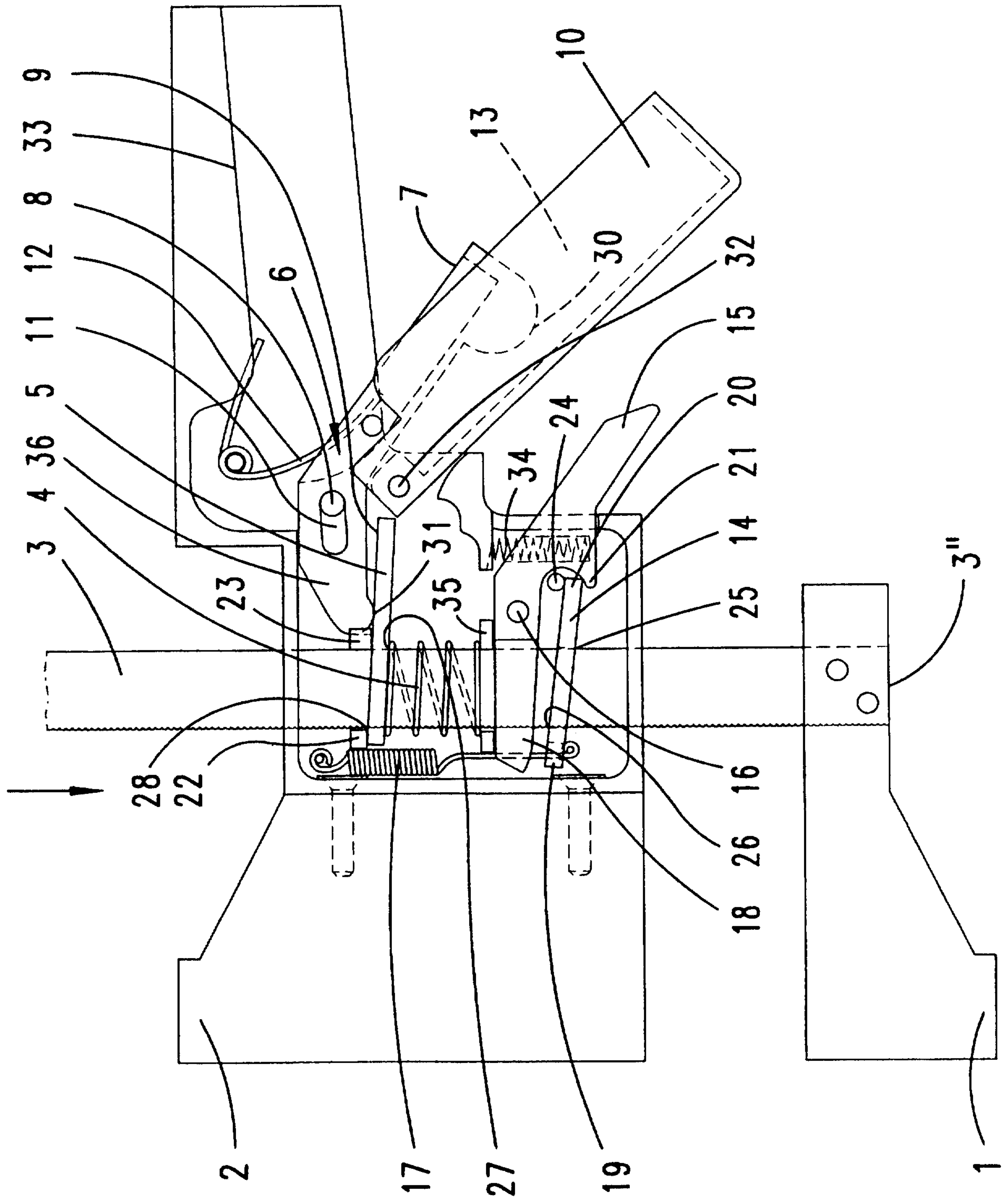
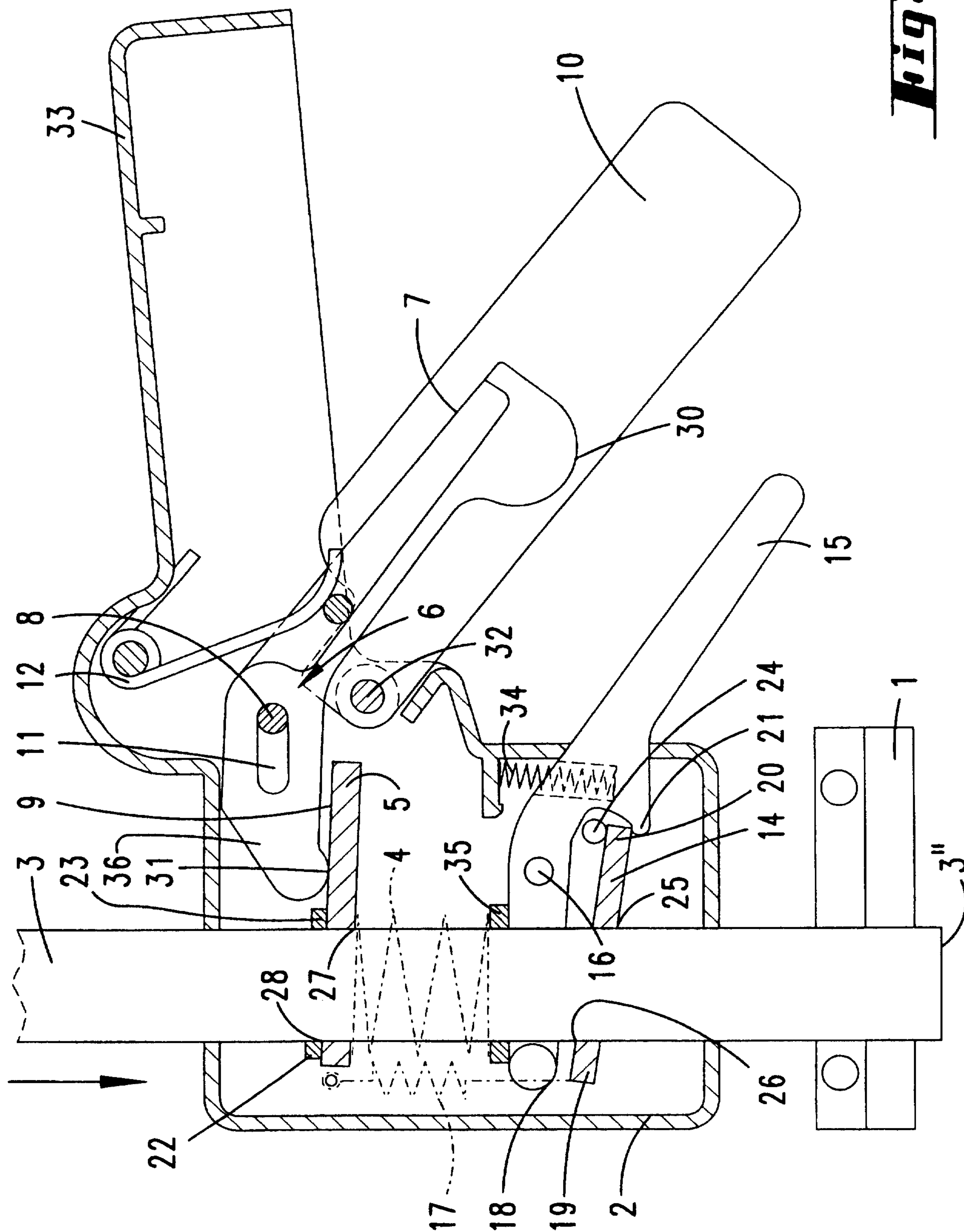


Fig. 8



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Fig. 9