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(54) **A DEVICE FOR SECURING SUPERIMPOSED REINFORCING RODS**

VORRICHTUNG ZUM VERBINDEN VON UEBEREINANDERLIEGENDEN ARMIERUNGSSTAEBEN

DISPOSITIF POUR RELIER DES TIGES D'ARMATURE SUPERPOSEES

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Description

The invention relates to a device for securing superimposed reinforcing rods by means of a length of wire that has been preformed into a substantially U-shaped staple, comprising a form piece with a U-shaped forming surface that is adapted to the staple, and with a casing having a receiving chamber for a staple located adjacent the opening of said U-shaped forming surface, the form piece and the casing being mounted so as to be mutually turned between an open position allowing two superimposed rods to be received in the space between the legs of the U-shaped forming surface and a closed position, in which the received rods are locked around, said casing accommodating a stamp adapted to be moved - under control of a piston cylinder device and while said casing and said form piece are in said mutually closed position - through said receiving chamber, towards the cross piece of the U-shaped forming surface of the form piece to press the staple - with its legs directed forwardly - fran the receiving chamber into the form space of the form piece around the pair of rods contained therein, guiding grooves being provided on the inner side of the legs and the cross piece of the forming surface to guide the staple legs within the cross piece portion of the form piece towards one another or one past the other respectively.

Such a device is disclosed in DE-A-3223090 (vide in particular the embodiment according to fig. 15).

With this well-known device the lower one of the two superimposed reinforcing rods is supported during the deformation of the preformed staple within the form piece so that the two rods are adequately pressed together.

With this well-known device the form piece is provided in a rather elongated member, which forms - together with the casing that is also provided in a rather elongated element - a pair of pincers, the lower and upper jaws of which are formed by the form piece and the casing respectively.

In the opened position the pincer-like device is applied with its lower jaw extending below the two superimposed reinforcing rods so as to receive these rods into the forming space confined by the U-shaped forming surface.

It is a drawback of this well-known device, that its handling may be hindered by adjacent reinforcing rods wich belong to the same reinforcing network. Due to the lower jaw (forming piece) being - in use - positioned completely below the plane of the uppermost reinforcing rod, the use of the device for securing superimposed reinforcing rods will be even impossible in case of a reinforcing net having a "hew" which is smaller than the horizontal dimension of the form piece.

NL-A-48839 discloses a device - in the form of a pair of pincers - for fastening a tendril of a plant to a suspension wire of cord that extends through a greenhouse. The fastening is effected by means of a split ring which is to be closed around the tendril and suspension wire. When moving the pincers from a spring-biased opened position towards a closed position a stamp member is caused to move a split ring from a magazin into the space between the operative pincer ends, said pincer ends forming together an U-shaped form piece when in the closed position. In a partially closed position (i.e. in a still partially opened position) - with the split ring received within the U-shaped form piece - the pair of pincers is placed around the tendril and suspension wire, after which the pincers are completely closed to squeeze and close the ring around the tendril and suspension wire. The squeezing of the split ring is effected in a direction transverse to the axis of the U-shaped form piece.

Furthermore DE-A-3524821 discloses a device for securing cross-wise superimposed reinforcing rods, in wich a form piece is used wich consists of two hook-shaped portions. This device may also be used in case of relatively "fine-mesh" reinforcing nets. With this well-known device the two hook-shaped forming portions are placed straddlingly over the upper one of the two crossing reinforcing rods and then hooked from under the lowermost reinforcing rod, after which the free end portions of the preformed staple are bent along the semi-circular inner forming surface of the hook-shaped forming portions and around the lowermost reinforcing rod in planes which are directed perpendicular to the plane of the staple. Consequently another type of connetion is involved with this well-known device, which cannot be used for securing superimposed reinforcing rods that extend in the same direction.

The invention aims at providing an improved devioe of the type above referred to which may be simply applied, with the form piece in the open position, around two superimposed reinforcing rods, even in case of a "fine-mesh" reinforcing net.

Accordingly the present invention provides a device as defined in the first part of claim 1, which is characterized by the features mentioned in the characteristic clause of claim 1.

It will be appreciated, that a device constructed in accordance with the invention may be simply applied - with the form piece in the open position - around the two superimposed reinforcing rods, even in case of a "fine-wesh" reinforcing net.

The invention will be hereinafter further explained by way of example with reference to the drawing.

Fig. 1 is a perspective view illustrating the principle of the method and of the device according to the invention;
fig. 2 is a side view of a practical embodiment of the device according to the invention,
fig. 3 is a view, as seen from the right in fig. 2;
fig. 4 is a view along the line IV-IV in fig. 2 and 3 and
fig. 5 is a cross-sectional view along the line V-V in fig. 2.

In fig. 1 two cross-wise superimposed reinforcing rods are designated by dash-dotted lines W. 1 designates a substantially U-shaped form piece, the legs 2 of which extend from below upwardly through two opposite angles between the two cross-wise superimposed reinforcing rods. The legs 2 merge along an arc into the cross piece 3 of the U and have beveled edges 2a. The opposite faces of the legs 2 are provided with guiding grooves 4. These guiding grooves continue in the cross-piece 3 and simultaneously deflect laterally from the plane of the U. Consequently the guiding groove portions 4a in the cross piece 3 extend laterally along one another.

The guiding grooves 4, 4a have e.g. a semi-circular cross-section and function to guide the legs K1 of a substantially U-shaped staple K. This staple is pushed from above - with its free leg ends directed downwardly - (vide the arrow direction) into the space between the legs 2 of the form piece 1 by means of a stamp member 5 that acts on the cross piece K2 of the staple K. During the final phase of downward stroke of the stamp member 5 the staple legs K1, while moving through the guiding groove portions 4a - gradually bend inwardly and simultaneously deflect laterally from the plane of the K to spread apart. Finally the so deformed staple K gets pressed with its cross piece K2 upon the upper one of the two superimposed rods W, while the bent end portions of the legs K1 of the staple K get pressed around the lower one of the two rods on both sides of the crossing point.

In the practical embodiment according to fig. 2-5 the U-shaped form piece 1 is divided along a midplane perpendicular to the plane of the U and consequently consists of two J-shaped halves or jaws 6 and 7. These jaws 6, 7 are pivotally connected about an axis 8 that is positioned within said midplane at a distance above the cross piece of the U. The jaws 6, 7 may thus move one relative to the other between a closed position corresponding with the position of U-shaped form piece 1 in fig. 1 and an open position, in which the form piece 1 may be placed - with the open jaws - down over superimposed reinforcing rods W. In the closed position the two jaws interlockingly engage one another by means of a centering hole and a corresponding centering projection 9 and 9a respectively.

The jaw 6 is a fixed jaw, in the sense, that this jaw is extended at its upper end and fastened to the lower end wall 11 of a pneumatic actuating cylinder 10, the upper end wall 12 of which is connected to a carrying rod 13 provided with a handle 14.

15 designates a staple supply magazine, comprising upper and bottom walls 16, sidewalls 17 and an end wall 18, which is also fixedly connected to the cylinder end wall 11. The end wall 18 carries the pivot axis 8, about which the second jaw 7 is pivotally mounted through a laterally slightly offset arm 19.

The pressurized air connection for operating the piston 20 has not been shown. The pressurized air supply may be e.g. controlled by means of a control valve provided on or adjacent the handle 14 and equipped with an appropriate actuating button.

The piston 20, which may be moved against the action of a pressure spring 21, is pivotally connected at 22 to the stamp member 5, that extends with its lower end through a slot 23 in the lower cylinder end wall 11 into a chamber at the end of the magazine 15. Said chamber, the cross-sectional area of which corresponds with that of the slot 23 in the cylinder end wall 11, is delimited by the end wall 18 and the sidewalls 17 of the magazine and has on the bottom side a passage slot 24 towards the space between the legs (jaws) of the U-shaped form piece 1, said passage 24 corresponding with the passage slot 23 in the cylinder end wall 10.

In the example shown a control means 25 of the Bowden cable type is provided for opening and closing the jaws 6 and 7. The stationary sheath 26 of this control cable is secured to the carrying rod 13 and the upper cylinder end wall 12 at 27 and 28 respectively, whereas the cable core 29 is, at 30, connected to a manually operated lever 32 that is pivotally connected at 31 to the handle 14, and, on the other hard, is connected at 33 to the free end of the arm 16, to which the movable jaw 7 is secured. Normally, i.e. when the lever 32 is not squeezed, the pressure spring 34 holds the jaw 7 in the opened position. In this position the device may thus be placed down over a pair of superimposed reinforcing rods so as to secure the latter together. The jaws 6, 7 and the U-shaped form piece 1 may then be closed around the reinforcing rods to be secured by squeezing the lever 32. In this stage the piston 20 is in its upper position, with the lower end of the stamp member 5 resting on the cross piece of the foremost staple of the staple supply within the chamber, i.e. ready to perform an operative stroke. While the lever 32 is held squeezed to keep the form piece closed, pressurized air is supplied to move the piston 20 and thereby the stamp member 5 downwardly. This causes the staple K to be pressed, in the above described manner, through the chamber at the end of the magazine into the space between the legs of the U-shaped form piece 1, whereby the staple legs are deformed, in the manner described hereinabove, into a fastener wire that secures the two reinforcing rods.

An interruption of the pressurized air supply causes the piston 20 and thereby the stamp member 5 to return to the upper or starting position, so that the magazine spring 35 may push a next staple, positioned at the foremost end of the magazine supply, into the chamber.

A release of the lever 32 causes the jaws 6, 7 to open, after which the device may be removed from the secured rods and transferred to a next securing location.

Claims

1. A device for securing superimposed reinforcing rods (W) by means of a length of wire that has been

preformed into a substantially U-shaped staple (K), comprising a form piece (1)

with a U-shaped forming surface that is adapted to the staple (K), and
with a casing (15) having a receiving chamber (15a) for a staple (K) located adjacent the opening of said U-shaped forming surface,
the form piece (1) and the casing (15) being mounted so as to be mutually turned between an open position allowing two superimposed rods (W) to be received in the space between the legs (2) of the U-shaped forming surface and
a closed position, in which the received rods (W) are locked around,
said casing (15) accommodating a stamp (5) adapted to be moved - under control of a piston cylinder device (10) and while said casing and said form piece are in said mutually closed position - through said receiving chamber (15a), towards the cross piece (3) of the U-shaped forming surface of the form piece (1) to press the staple (K) - with its legs (K1) directed forwardly - from the receiving chamber (15a) into the form space of the form piece (1) around the pair of rods (W) contained therein,
guiding grooves (4, 4a) being provided on the inner side of the legs (2) and the cross piece (3) of the forming surface to guide the staple legs (K1) within the cross piece portion (3) of the form piece (1) towards one another or one past the other respectively,

characterized in that said form piece (1) is formed as a U-shaped brace (6, 7), which is divided along the mid plane perpendicular to the plane of the brace, one part (6) of the brace being fixedly connected together with said casing (15) and said piston cylinder device (10) to a carrying rod extending from said piston cylinder device upwardly substantially along the axis of symmetry of said form piece (1), whereas the other part (7) of the brace being mounted to be swung outwardly relative to said first part.

2. A device according to claim 1, characterized in that the fixed part (6) and the movable part (7) of the brace-like form piece (1) are spring-biased in the opened position, the movable part (7) being connected, through a flexible means of the Bowden cable type to an actuating lever provided on a grip at the upper end of said carrying rod for closing said form piece (1) against said spring bias, said grip also carrying the means for operating said piston cylinder device.

Patentansprüche

1. Vorrichtung zum Verbinden von übereinanderliegenden Bewehrungsstäben (W) mittels eines zu einer etwa U-förmigen Klammer (K) vorgeformten Drahtstückes, umfassend ein Formstück (1)

mit einer der Klammer (K) entsprechenden U-förmigen Formfläche und
mit einem Gehäuse (15), das im Gebiet der Öffnung der U-förmigen Formfläche eine Aufnahme (15a) für eine Klammer (K) aufweist,
welches Formstück (1) und welches Gehäuse (15) untereinander drehbar sind zwischen
einer geöffneten Lage, in der zwei übereinanderliegenden Stäbe (W) im Raum zwischen den Schenkeln (2) der U-förmigen Formfläche aufgenommen werden können und
einer geschlossenen Lage, in der die aufgenommenen Stäbe (W) ringsherum eingeschlossen sind,
welches Gehäuse (15) einen Stempel (5) enthält, der - unter Steuerung einer Kolben-Zylindervorrichtung (10) und während das Gehäuse und das Formstück ihre gegenseitige Schliesslage einnehmen - durch die Aufnahme (15a) hindurch gegen den Steg (3) der U-förmigen Formfläche des Formstückes (1) bewegbar ist in der Weise, dass die Klammer (K) - mit den Schenkeln (K1) nach vorne gerichtet - aus der Aufnahme (15a) in den Formraum des Formstückes (1) um die zwei in diesem vorhandenen Stäbe (W) gepresst wird,
wobei an der Innenseite der Schenkel (2) und des Steges (3) der Formfläche Führungsnuten (4, 4a) vorgesehen sind, welche die Klammerschenkel (K1) innerhalb des Steges (3) des Formstückes (1) gegeneinander oder aneinandervorbei führen,

dadurch gekennzeichnet, dass das Formstück (1) in der Gestalt eines U-förmigen Bügels (6, 7) ausgebildet ist, welcher gemäss der senkrecht zur Bügelebene liegenden Symmetrie-Ebene geteilt ist, wobei der eine Bügelabschnitt (6), das Gehäuse (15) und die Kolben-Zylindervorrichtung (10) insgesamt mit einer sich von der Kolben-Zylindervorrichtung etwa gemäss der Symmetrie-Achse des Formstückes (1) nach oben erstreckenden Tragstange fest verbunden sind, während der zweite Bügelabschnitt (7) relativ zum ersten Bügelabschnitt ausschwenkbar ist.

2. Vorrichtung nach Anspruch 1, dadurch gekennzeichnet, dass der feste Abschnitt (6) und der bewegliche Abschnitt (7) des bügelförmigen Formstückes (1) durch eine feder in der Schliessrichtung vorgespannt sind, wobei zum Schliessen des Form-

stückes gegen die Vorspannung der bewegliche Abschnitt (7) durch ein biegsames Mittel des Bowden-Zugtyps mit einem auf einem Handgriff am oberen Ende des Tragstanges vorgesehenen Bedienungshebel verbunden ist und wobei der Handgriff auch die Bedienungsmittel für die Kolben-Zylindervorrichtung trägt.

Revendications

1. Dispositif pour fixer solidement des tiges de renfort superposées (W) au moyen d'une certaine longueur de fil métallique qui a été préformé en une agrafe sensiblement en forme de U (K), comprenant une pièce de formage (1)

   ayant une surface de formage en forme de U qui est adaptée à l'agrafe (K), et
   ayant un boîtier (15) comportant une chambre de réception (15a) pour une agrafe (K) située à côté de l'ouverture de ladite surface de formage en forme de U,
   la pièce de formage (1) et le boîtier (15) étant montés de façon à être mutuellement tournés entre
   une position ouverte permettant à deux tiges superposées (W) d'être reçues dans l'espace entre les montants (2) de la surface de formage en forme de U et
   une position fermée dans laquelle les tiges reçues (W) sont verrouillées,
   ledit boîtier (15) logeant un poinçon (5) conçu pour être déplacé - sous la commande d'un dispositif formant vérin à piston (10) et tandis que ledit boîtier et ladite pièce de formage sont dans ladite position mutuellement fermée - par l'intermédiaire de ladite chambre de réception (15a), vers la pièce transversale (3) de la surface de formage en forme de U de la pièce de formage (1) pour presser l'agrafe (K) - ses jambes (K1) étant dirigées vers l'avant - depuis la chambre de réception (15a) dans l'espace de formage de la pièce de formage (1) autour du couple de tiges (W) contenues à l'intérieur,
   des rainures de guidage (4, 4a) réalisées sur le côté intérieur des montants (2) et de la pièce transversale (3) de la surface de formage pour guider respectivement les jambes de l'agrafe (K1), à l'intérieur de la partie formant pièce transversale (3) de la pièce de formage (1), l'une vers l'autre ou l'une après l'autre,

   caractérisé en ce que ladite pièce de formage (1) est formée comme une bride en forme de U (6, 7), qui est divisée le long du plan médian perpendiculaire au plan de la bride, une partie (6) de la bride étant reliée, de façon fixe, en même temps que ledit boîtier (15) et que ledit dispositif formant vérin à piston (10), à une tige de support s'étendant vers le haut depuis ledit dispositif formant vérin à piston, sensiblement le long de l'axe de symétrie de ladite pièce de formage (1), étant donné que l'autre partie (7) de la bride est montée pour être pivotée vers l'extérieur par rapport à ladite première partie.

2. Dispositif selon la revendication 1, caractérisé en ce que la partie fixe (6) et la partie mobile (7) de la pièce de formage en forme de bride (1) sont poussées par ressort dans la position ouverte, la partie mobile (7) étant reliée, par l'intermédiaire d'un moyen souple du type câble Bowden, à un levier de mise en oeuvre disposé sur une poignée au niveau de l'extrémité supérieure de ladite tige de support pour fermer ladite pièce de formage (1) contre la poussée dudit ressort, ladite poignée portant également les moyens pour mettre en oeuvre ledit dispositif formant vérin à piston.

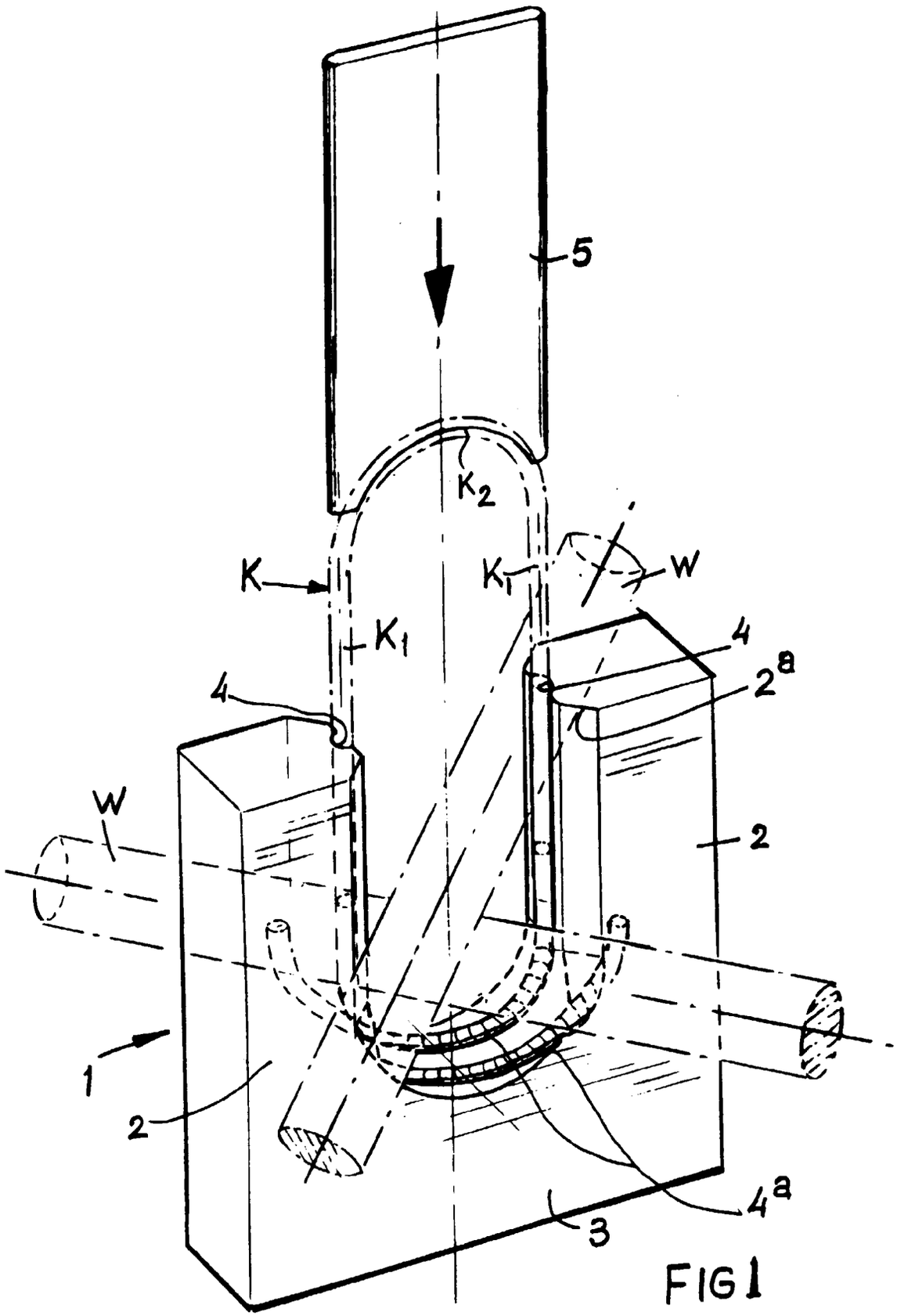
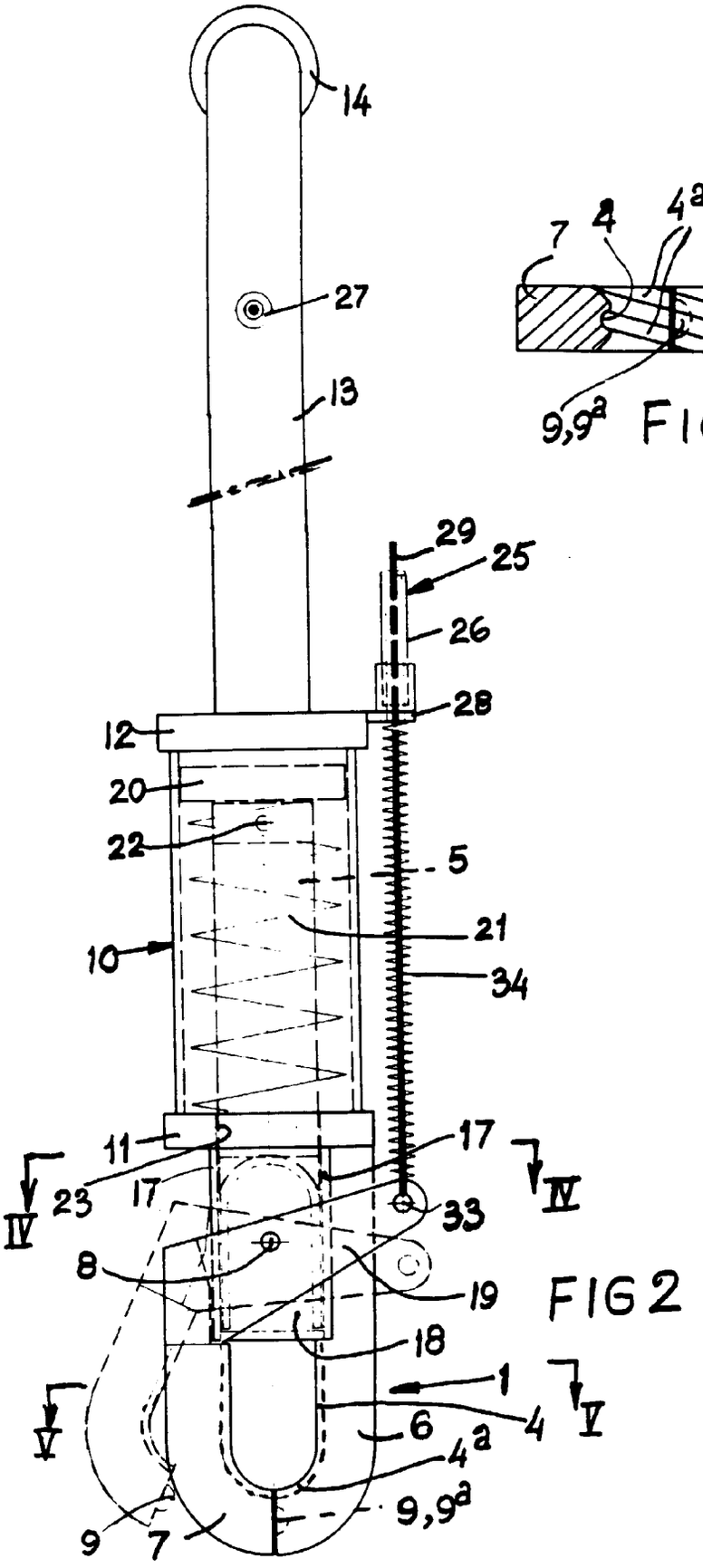


FIG 1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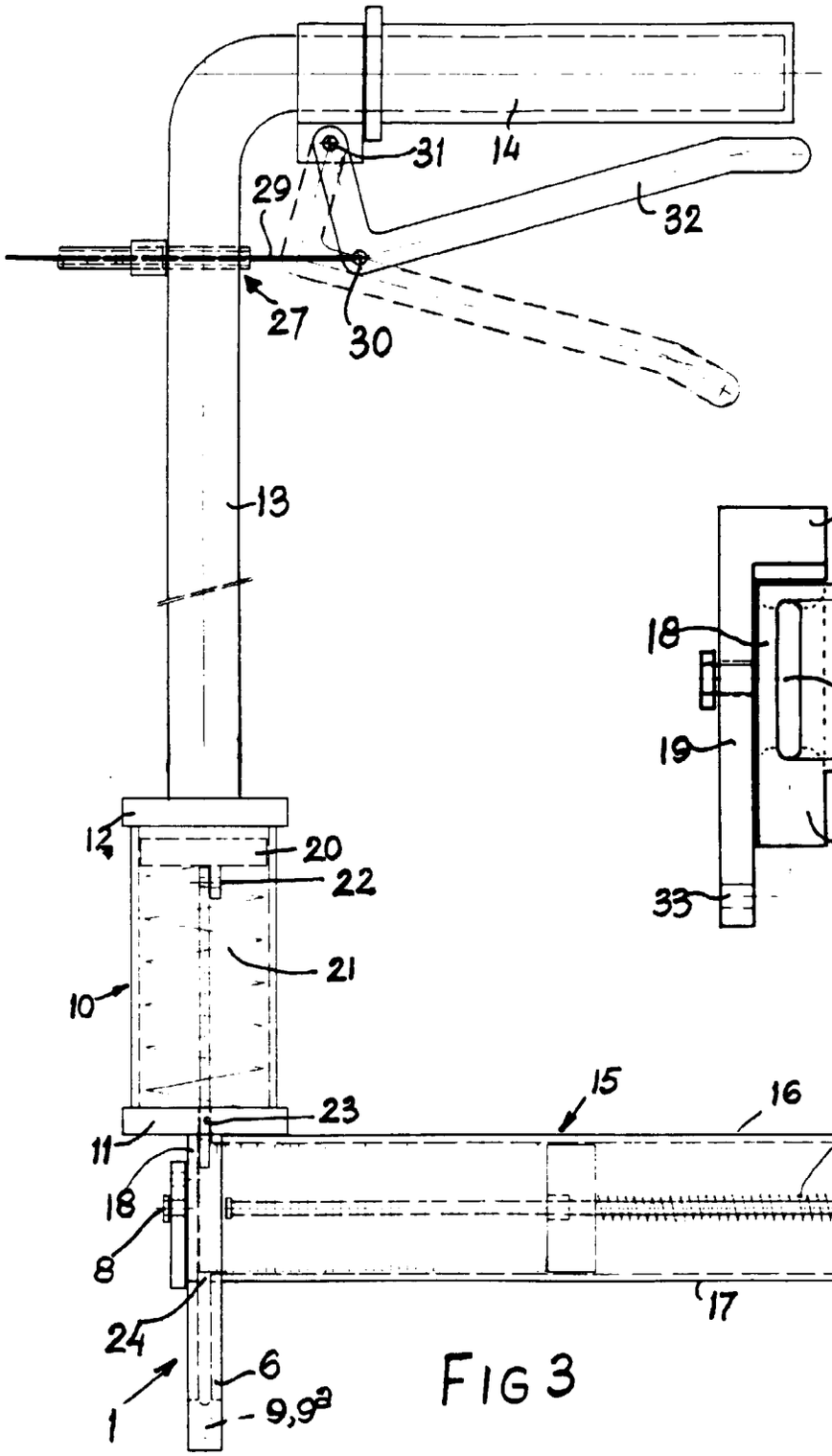
11
17
23
17
33
8
19
18
1
6
4
4a
9,9a
9
7
IV
IV
V
V

FIG 2

7
4
4a
4
6
9,9a

FIG 5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6
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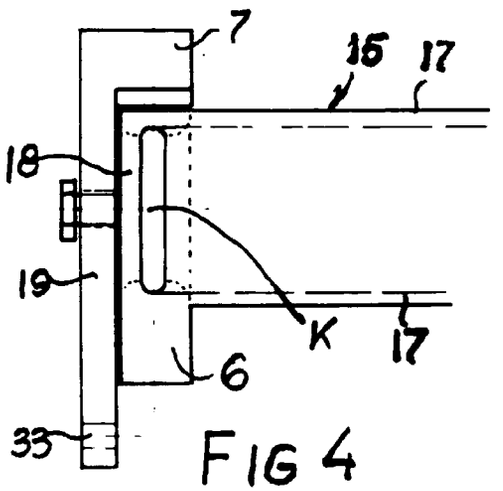
9,9a
17

FIG 3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15
17
18
19
K
17
6
33

FIG 4