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(54) **Punch nipper, in particular for metal section bars**

Stanzzange, insbesondere für Metallprofile

Pince à poinçonner, en particulier pour profilés métalliques

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Description

BACKGROUND OF THE INVENTION

FIELD OF THE INVENTION

[0001] The present invention relates to a nipper able to punch a section bar to for allowing the laying of a pipe.

DESCRIPTION OF THE RELATED ART

[0002] Panels in different sizes are used to divide spaces and build false ceilings. The same is done to create barriers; in this case, panels with different features are used: heat resistance, fire resistance, moisture resistance, etc. Panels are usually supported by a supporting structure made up of metal section bars. These section bars are usually U-shaped and have a reduced thickness. When installing the electric system, the water supply system, the gas system or any other system, it is necessary to lay pipes along the newly built walls or false ceilings. Said pipes contain electric wires or convey fluids. To allow the laying of said pipes, holes are drilled in the supporting metal section bars, which have the highest bearing capacity.

[0003] The drilling of the metal section bars can be carried out in the factory. This means, however, that the holes in the section bars, although they are perfect, are sometimes located in positions which are not suitable for the plant to be realized.

[0004] Alternatively, workers have to drill holes in the untouched metal section bars as the need arises. The holes can be drilled by means of punches, metal points or drill circle cutters. The use of these hand tools, however, creates in the metal section bar irregularly shaped and serrated blades facing the inside of the metal section bar. While the pipe is inserted into the hole, the serrated edges can hinder the insertion or damage the pipe through abrasion. The metal section bars can also lose their shape due to the impact. Holes drilled with drill circle cutters, on the contrary, have no irregular blades inside the metal section bar. The use of this electric tool, however, always creates a cutting edge along the perimeter of the hole, which might damage the pipe inserted into the hole.

[0005] The Patent US-A-5287716 is also known, which discloses a punch nipper for metal section bars where a hollow die is affixed to a handle, which is made of square tubing. This handle is pivotally connected, by a bolt, to one end of a link.

[0006] A support is also affixed to the handle. A jaw is pivotally connected by a second bolt to said support and can be pushed towards the handle or retracted from it by a lever, which is pivotally connected to the jaw by a third bolt. The lever is pivotally connected to the link by a fourth bolt. A piercer is affixed to the end of the jaw by a screw. The lever is extended by a handle. Both handles are equipped with rubber or plastic handgrips.

[0007] The Patent US-A-345687 is known as well, which discloses a hand-tool for cutting through two or more sheets of sheet metal, forming one or more tongues therein and rolling back the tongues, so as to form a clinch-fastening. It consists of three parts, where the first part is made up of a handle and cheeks and has a clearance, the second part is set between the cheeks and is pivoted to the first part, the third part is pivoted to the cheeks and is provided with an eccentric slot and a cam, which is also connected to the second part by a pivot housed in its slot.

SUMMARY OF THE INVENTION

[0008] The main goal of this invention is the realization of a hand punch nipper which can punch metal section bars with a higher force and with more efficiency than known punch nippers.

[0009] A second goal is the realization of a hand punch nipper which can bend blades resulting from the punching, thus avoiding problems during the insertion of pipes into the holes thus created.

[0010] This and other goals are reached by the punch nipper that is the object of the patent, which is composed of a supporting arm, an operating arm and a lever arm. The supporting arm is a rectilinear element which is preferably made up of an oval profile. Its proximal end is covered by an anatomically-designed covering, while a support, which can partially embrace the section bar, is secured to its distal end by a knob or bolt.

[0011] The ends of at least two pairs of brackets are fixed to two opposing sides of the supporting arm; one pair of brackets is close to the proximal end of the supporting arm, while the other pair is close to its distal end. The brackets face the operating arm. Each bracket has at least one hole near its free end and the two holes of each pair of brackets are coaxial. The operating arm is a rectilinear element and presents at its distal end an element which is approximately orthogonal to the operating arm itself and which is linked or directly fixed to it.

[0012] A point is secured to the free end of said orthogonal element. The operating arm is pivoted to the supporting arm by means of a pin inserted into the pair of brackets near the proximal end of the supporting arm. The operating arm moves between the brackets located near the distal end of the supporting arm.

[0013] A small plate and a small rod are fixed onto the operating arm; the free end of said rod is bent towards the body. The above mentioned small plate is located near the distal end of the operating arm and on the side facing the lever arm. The lever arm is rectilinear and has a proximal end covered by an anatomically-designed covering as well as a cam-shaped body fixed to its distal end. Said cam-shaped body has a rectilinear edge linked to a curvilinear edge. A hole is drilled opposite said edges. A peripheral slit follows both the curvilinear edge and the rectilinear edge. The lever arm is pivoted to the supporting arm by means of a pin inserted into the pair of brackets

near the distal end of the supporting arm.

[0014] The free, bent end of the small rod fixed to the operating arm is housed in the slit of the cam-shaped body. The small rod and the slit, acting as pivot elements, can be substituted by a spring located near the brackets close to the proximal end of the supporting arm.

[0015] The point fixed to the free end of the operating arm is shaped as a frustum of pyramid or of cone and is divided into quadrants. Each quadrant is delimited by two cutting edges going from the end of the point to its periphery. Two grooves in each quadrant delimit an area which is preferably located at the same height as the cutting edges.

[0016] The support includes a plate which is partially inserted into the distal end of the supporting arm. A small, L-shaped plate is fixed orthogonally to said plate. Two blades are fixed onto the distal part of the small plate. Said distal part can also have roughly the shape of a circular half-crown and have no blades.

[0017] Thanks to the punch nipper that is the object of the patent, it is possible to punch holes in section bars quickly and easily. The presence of the cam and its location at the distal end of the lever arm reduce the strength necessary to carry out the punching.

[0018] The punch nipper that is the object of the patent has less pins than known nippers. The small rod and the slit, or the spring, acting as pivot elements enable a reliable opening of the nipper.

[0019] The wings formed by the cut and crimped edges of the punched holes are bent towards the inside of the section bar and act as slides, thus helping the pipe slide into the hole without being damaged.

BRIEF DESCRIPTION OF THE DRAWINGS

[0020] Further characteristics and advantages of the invention will be manifest thanks to the description of one type of execution of the punch nipper, which is illustrated by way of example, and not as limitation, in the attached drawings, in which:

- Figure 1 shows a side view of the punch nipper;
- Figure 2 shows another side view of the punch nipper when the punching process begins;
- Figure 3 shows an enlarged side view of a first support embracing the section bar;
- Figure 4 shows an enlarged front view of the support shown in Figure 3;
- Figure 5 shows an enlarged side view of the body fixed to the end of the lever arm;
- Figure 6 shows an enlarged perspective view of the punching point;
- Figure 7 shows a perspective view of the hole with wings created by the punch nipper that is the object of the patent;
- Figure 8 shows an enlarged side view of a second support embracing the section bar;
- Figure 9 shows an enlarged front view of the support shown in Figure 8;
- Figures 10, 11 and 12 show as many operational views of the punch nipper.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0021] More in detail and with reference to the attached Figures, the punch nipper that is the object of the patent is made up of a supporting arm 1, an operating arm 2 and a lever arm 3. The supporting arm 1 is a rectilinear profile with oval cross section, with one proximal end, covered by an anatomically-designed covering 1.1, and a distal end. A support 4, which can embrace at least partially the metal section bar, is secured to said distal end.

[0022] The support 4 includes a Z-shaped plate 4.1, the three parts of which are arranged orthogonally to one another. An end of the plate 4.1 is partially inserted into the distal end of the supporting arm 1 and is linked to it by means of a knob 5, which is locked by a nut going through a hole 4.2 created in the plate 4.1 itself and holes 1.2 created in the supporting arm 1. A small, L-shaped plate 4.3 is fixed orthogonally onto the central part and onto the distal part of the plate 4.1.

[0023] Two hooked blades 4.4 positioned in a swallow-tailed shape are fixed orthogonally to the distal part of the small plate 4.3.

[0024] The ends of the first two brackets 6 are fixed onto two opposing sides of the supporting arm 1. The brackets 6 are located near the proximal end of the supporting arm 1. They are fixed to two opposing walls of the supporting arm 1 itself and are arranged orthogonally to it towards the operating arm 2. Each bracket 6 has a hole near its free end. The holes of the two brackets 6 are coaxial.

[0025] The ends of a second pair of brackets 7 are also fixed to the supporting arm 1, near the distal end of the supporting arm 1 and on two opposing walls of said supporting arm 1. The second pair of brackets is also arranged towards the operating arm 2. Each bracket 7 is approximately triangle-shaped, its base is parallel to the longitudinal axis of the supporting arm 1 and its height is orthogonal to the supporting arm 1 itself. Each bracket 7 has a hole near its free end. The holes of the two brackets 7 are coaxial.

[0026] The operating arm 2 is a lamina made up of a first part flanking the supporting arm 1, by a second part which is approximately orthogonal to the first part and by a connecting part. A point 2.1 is fixed to the distal end of the second part.

[0027] The point 2.1 is directed to the support 4. The point 2.1 is shaped as a frustum of pyramid and divided into quadrants. Each quadrant is delimited by two cutting edges 2.11 going from the end of the point 2.1 to its periphery. In each quadrant, two peripheral grooves 2.12 delimit a central area 2.13 at the same height as the cutting edges 2.11.

[0028] A small plate 2.2 is fixed to the operating arm 2 near the distal end of the part flanking the supporting arm 1 and on the side facing the lever arm 3. A small rod 2.3 is fixed onto the operating arm 2; the free end 2.31 of said rod 2.3 is bent at a 90° angle.

[0029] A hole is drilled near the proximal end of the supporting arm 2. A bolt 8 pivoting the supporting arm 1 to the operating arm 2 is housed in said hole and in the holes in the free ends of the brackets 6. The operating arm 2 moves between the brackets 7 located near the distal end of the supporting arm 1.

[0030] The lever arm 3 is a rectilinear tubular profile to the distal end of which a cam-shaped body 3.1 is fixed. Said body has a rectilinear edge 3.11 linked to a curvilinear edge 3.12. A hole 3.13 is drilled opposite said edges 3.11, 3.12. The distance from the hole 3.13 to the end of the curvilinear edge 3.12 is shorter than the distance from the hole 3.13 to the end of the rectilinear edge 3.11. A peripheral slit 3.14 follows both the curvilinear edge 3.12 and the rectilinear edge 3.11. The distance from the hole 3.13 to the end of the slit 3.14 corresponding to the curvilinear edge 3.12 is shorter than the distance from the hole 3.13 to the end of the slit 3.14 corresponding to the rectilinear edge 3.11.

[0031] The free, bent end 2.31 of the small rod 2.3 fixed to the operating arm 2 is housed in the slit 3.14.

[0032] The body 3.1 - and consequently also the lever arm 3 - is pivoted to the supporting arm 1 by means of a bolt 9 inserted into the holes drilled in the free ends of the brackets 7 and in the hole 3.13 of the body 3.1. The lever arm 3 also has a proximal end covered by an anatomically-designed covering 3.15.

[0033] When the punch nipper is used, the support 4 of the supporting arm 1 embraces the section bar. Assuming ideally a vertical arrangement of the supporting arm 1, the operating arm 2 moves distally away from the supporting arm 1 by approximately 10° and the lever arm 3 is raised until it is located at approximately a 100° angle to the supporting arm 1. At this moment, the end of the curvilinear edge 3.12 of the body 3.1 touches the small plate 2.1 fixed to the operating arm 2 and the free end 2.31 of the small rod 2.3 is inserted into the end of the slit 3.14 corresponding to the curvilinear edge 3.12. When the proximal end of the lever arm 3 is quickly brought closer to the proximal end of the supporting arm 1, the lever arm 3 rotates about the bolt 9 acting as fulcrum. The body 3.1, which is forced to rotate by the movement of the lever arm 3 fixed to it, slides on the small plate 2.2 going from the curvilinear edge 3.12 to the rectilinear edge 3.11. At the same time, the free, bent end 2.31 of the small rod 2.3 slides in the slit 3.14 until it reaches the second end of said slit 3.14.

[0034] Considering that the distance from the pin, made up of the bolt 9 inserted into the hole 3.13, to the edges 3.11, 3.12 increases when going from the curvilinear edge 3.12 to the rectilinear edge 3.11, the lever arm 3 forces the distal end of the operating arm 2 to get closer to the supporting arm 1 by rotating about the bolt 8. The rotation of the cam made up of the body 3.1 about the operating arm 2 causes the point 2.1 at the end of the operating arm 2 to quickly and clearly get closer to the support 4. The point 2.1 easily punches the section bar and is then housed between the two blades 4.4 of the support 4. When the punching is carried out, only the point 2.1 crosses the wall of the metal section bar. The cutting edges 2.11 cut the section bar creating an X-shape cut, thus forming four triangular wings 10. Afterwards the areas 2.13 delimited by the grooves 2.12 press and crimp the wings 10 of the section bar inwards.

[0035] The small rod 2.3 slides within the slit 3.14, thus keeping the operating arm 2 always close to the body 3.1 of the lever arm 3. This is particularly useful both when closing the punch nipper, when the lever arm 3 moves quickly as regards the operating arm 2 and this could disconnect, and when opening the punch nipper. The small rod 2.3 still keeps the operating arm 2 close to the body 3.1 even while the operating arm 2 moves away from the supporting arm 1.

[0036] Figures 8, 9 show a differently shaped support 4 which is suitable for section bars located near a wall corner. In this situation, the development of the central part of the plate 4.1 prevents the support 4 from embracing the section bar. The support 4 shown in Figures 8, 9 includes a plate 4.1, onto which a part 4.31 of a small, L-shaped plate 4.3 is fixed orthogonally. The part 4.31 is short. The part 4.32 of the small plate 4.3, orthogonal to the part 4.31, has roughly the shape of a circular half-crown. During operation, the point 2.1, located at the end of the operating arm 2, goes beyond the part 4.32. This support 4 and the other support described above can easily be mounted onto the supporting arm 1 by acting on the knob 5.

Claims

1. Punch nipper, particularly for metal section bars, comprising a supporting arm (1), an operating arm (2) and a lever arm (3); the supporting arm (1) is a rectilinear element, preferably a profile with oval cross section, with one proximal end covered by an anatomically-designed covering (1.1) and a distal end, onto which a support (4), which can partially embrace the metal section bar to be punched, is secured by means of a knob (5) or a bolt; the ends of at least two pairs of brackets (6, 7) are fixed to two opposing sides of the supporting arm (1); a first pair of brackets (6) is located near the proximal end of the supporting arm (1), while the second pair of brackets (7) is located near its distal end; the brackets (6, 7) face the operating arm (2); each bracket (6, 7) has at least one hole near its free end; the holes of each pair of brackets (6, 7) are coaxial; the operating arm (2) is a rectilinear element and presents at its distal end a part which is approximately orthogonal to the operating arm (2) itself; a point

(2.1) directed to the support (4) is secured to the free end of said orthogonal element of the operating arm (2); the point (2.1) is shaped as a frustum of pyramid or of cone and is divided into quadrants; each quadrant is delimited by two cutting edges (2.11) going from the end of the point (2.1) to its periphery; the operating arm (2) is pivoted to the supporting arm (1) by means of a pin made up of a bolt (8) inserted into the holes in the free ends of the first pair of brackets (6) located near the proximal end of the supporting arm (1) and in the proximal end of the operating arm (2); the operating arm (2) moves between the brackets (7) located near the distal end of the supporting arm (1); the lever arm (3) is a rectilinear element, preferably made up of a tubular profile with a proximal end covered by an anatomically-designed covering (3.15); a cam-shaped body (3.1) is fixed to the distal end of the lever arm (3); the lever arm (3) is pivoted to the supporting arm (1) by means of a pin made up of a bolt (9) inserted into the holes in the free ends of the second pair of brackets (7) located near the distal end of the supporting arm (1) and in the body (3.1); the punch nipper is **characterized in that** said cam-shaped body (3.1) has a rectilinear edge (3.11) linked to a curvilinear edge (3.12); a hole (3.13) is drilled opposite said edges (3.11, 3.12); said hole (3.13) houses the bolt (9) pivoting the lever arm (3) to the supporting arm (1); a peripheral slit (3.14) follows both the curvilinear edge (3.12) and the rectilinear edge (3.11); the free end (2.31) of a small rod (2.3) fixed to the operating arm (2) is housed in the slit (3.14); the free end (2.31) of the small rod (2.3) is bent towards the body; said edges (3.11, 3.12) of the body (3.1) of the lever arm (3) slide on a small plate (2.2) fixed to the operating arm (2) near its distal end and on the side facing the lever arm (3); said point (2.1) fixed to the free end of the operating arm (2) has two peripheral grooves (2.12) delimiting a central area (2.13), preferably located at the same height as the cutting edges (2.11), in each quadrant delimited by two cutting edges (2.11).

2. Punch nipper, according to Claim 1, **characterized in that** the support (4) comprises a plate (4.1) which is partially inserted into the distal end of the supporting arm (1) and is secured to said arm by means of a knob (5) or bolt, locked by a nut, going through a hole (4.2) of the plate (4.1) itself and holes (1.2) of the supporting arm (1).

3. Punch nipper, according to Claim 2, **characterized in that** the support (4) comprises a Z-shaped plate (4.1), the three parts of which are arranged orthogonally to one another; the proximal part is partially inserted into the distal end of the supporting arm (1); a small, L-shaped plate (4.3) is fixed orthogonally onto the central part and onto the distal part of the plate (4.1); two blades (4.4) facing the point (2.1) are fixed onto the distal part of the small plate (4.3).

4. Punch nipper, according to Claim 2, **characterized in that** the support (4) comprises a plate (4.1) which is partially inserted into the distal end of the supporting arm (1), onto which a part (4.31) of a small, L-shaped plate (4.3) is fixed orthogonally; the part (4.32) of the small plate (4.3), orthogonal to the part (4.31), has roughly the shape of a circular half-crown.

5. Punch nipper, according to Claim 1, **characterized in that** the operating arm (2) is a rectilinear element made up of a first part flanking the supporting arm (1), a second part which is approximately orthogonal to the first part and of a connecting part located between the other parts; the point (2.1) is fixed to the distal end of the second part.

6. Punch nipper, according to Claim 1, **characterized in that** the operating arm (2) is a rectilinear element made up of a first part flanking the supporting arm (1) and a second part, directly fixed to the first part and approximately orthogonal to it; the point (2.1) is fixed to the distal end of the second part.

7. Punch nipper, according to Claim 1, **characterized in that** the small rod (2.3) and the slit (3.14) acting as pivot elements during the movement of the lever arm (3) are substituted by a spring located between the supporting arm (1) and the operating arm (2); said spring is located close to the first pair of brackets (6) near the proximal end of the supporting arm (1).

Patentansprüche

1. Stanzzange, insbesondere für Metallprofile, mit einem Tragarm (1), einem Betätigungsarm (2) und einem Hebelarm (3); wobei der Tragarm (1) ein geradliniges Element, vorzugsweise ein Profil mit einem ovalen Querschnitt mit einem proximalen Ende, das durch eine anatomisch ausgelegte Abdeckung (1.1) abgedeckt ist und mit einem distalen Ende ist, auf dem eine Halterung (4), die teilweise ein zu stanzendes Metallprofil umgreifen kann, mit Hilfe eines Knopfes (5) oder eines Bolzens befestigt ist; wobei die Enden von zumindest zwei Paaren von Haltebügeln (6, 7) an zwei entgegengesetzten Seiten des Tragarms (1) befestigt sind; wobei ein erstes Paar von Haltebügeln in der Nähe des proximalen Endes des Tragarms (1) angeordnet ist, während das zweite Paar von Haltebügeln (**3**)? in der Nähe von dessen distalen Ende angeordnet ist; wobei die Haltebügel (6, 7) auf den Betätigungsarm (2) gerichtet sind; wobei jeder Haltebügel (6, 7) zumindest eine Bohrung in der Nähe seines freien Endes aufweist; wobei die Bohrungen jedes Paares von Haltebügeln (6, 7) ko-

axial sind; wobei der Betätigungsarm (2) ein geradliniges Element ist und an seinem distalen Ende einen Teil aufweist, der angenähert orthogonal zu dem Betätigungsarm (2) selbst ist; wobei eine Spitze (2.1), die auf die Halterung (4) gerichtet ist, an dem freien Ende des orthogonalen Elementes des Betätigungsarms (2) befestigt ist; wobei die Spitze (2.1) als Stumpf einer Pyramide oder eines Kegels geformt und in Quadranten unterteilt ist; wobei jeder Quadrant durch zwei Schneidkanten (2.11) begrenzt ist, die von dem Ende der Spitze (2.1) zu dessen Umfang verlaufen; wobei der Betätigungsarm (2) an dem Tragarm (1) schwenkbar mit Hilfe eines Bolzens befestigt ist, der durch eine Schraube (8) gebildet ist, die in die Bohrungen in den freien Enden des ersten Paares von Haltebügeln (6), der sich in der Nähe des proximalen Endes des Tragarms (1) befindet, und in das proximale Ende des Betätigungsarms (2) eingesetzt ist; wobei sich der Betätigungsarm (2) zwischen den Haltebügeln (7), die in der Nähe des distalen Endes des Tragarms (1) angeordnet sind, bewegt; wobei der Hebelarm (3) ein geradliniges Element ist, das vorzugsweise aus einem rohrförmigen Profil mit einem proximalen Ende besteht, das durch eine anatomisch ausgelegte Abdeckung (3.15) abgedeckt ist; wobei ein nockenförmiger Körper (3.1) an dem distalen Ende des Hebelarms (3) befestigt ist, wobei der Hebelarm (3) an dem Tragarm (1) mithilfe eines Bolzens schwenkbar befestigt ist, der durch eine Schraube (9) gebildet ist, die in die Bohrungen in den freien Enden der Haltebügel (7) eingesetzt ist, die sich in der Nähe des distalen Endes des Tragarms (1) und des nockenförmigen Körpers (3.1) angeordnet sind; wobei die Stanzzange **dadurch gekennzeichnet ist, dass** der nockenförmige Körper (3.1) eine geradlinige Kante (3.11) aufweist, die mit einer gekrümmten Kante (3.12) verbunden ist; wobei eine Bohrung (3.13) entgegengesetzt zu den Kanten (3.11, 3.12) gebohrt ist; wobei die Bohrung (3.13) die Schraube (9) aufnimmt, die den Hebelarm schwenkbar an den Tragarm (1) befestigt; wobei ein Umfangsschlitz (3.14) sowohl der gekrümmten Kante (3.12) als auch der geradlinigen Kante (3.11) folgt, wobei das freie Ende (2.31) einer kleinen Stange (2.3), die an dem Betätigungsarm (2) befestigt ist, von den Schlitz (3.14) aufgenommen wird; wobei das freie Ende (2.31) der kleinen Stange (2.3) in Richtung auf den Körper gebogen ist; wobei die Kanten (3.11, 3.12) des Körpers (3.1) des Hebelarms (3) auf einer kleinen Platte (2.2) gleiten, die an dem Betätigungsarm (2) in der Nähe von dessen distalen Ende und auf der Seite befestigt ist, die auf den Hebelarm (3) gerichtet ist, wobei die Spitze (2.1), die an dem freien Ende des Betätigungsarms (2) befestigt ist, zwei Umfangsnuten (2.12) aufweist, die einen zentralen Bereich (2.13) begrenzen, der vorzugsweise in der gleichen Höhe wie die Schneidkanten (2.11) in jedem Quadranten angeordnet ist, der durch zwei Schneidkanten (2.11) begrenzt ist.

2. Stanzzange nach Anspruch 1, **dadurch gekennzeichnet, dass** die Halterung (4) eine Platte (4.1) umfasst, die teilweise in das distale Ende des Tragarms (1) eingesetzt ist und an dem Arm mithilfe eines Knopfes (5) oder einer Schraube befestigt ist, die durch eine Mutter festgelegt ist, und die durch eine Bohrung (4.2) der Platte (4.1) selbst und Bohrungen (1.2) des Tragarms (1) hindurchläuft.

3. Stanzzange nach Anspruch 2, **dadurch gekennzeichnet, dass** die Halterung (4) eine Z-förmige Platte (4.1) umfasst, deren drei Teile unter einem rechten Winkel zueinander angeordnet sind; wobei der proximale Teil teilweise in das distale Ende des Tragarms (1) eingesetzt ist; dass eine kleine L-förmige Platte (4.3) unter einem rechten Winkel auf den Mittelteil und auf den distalen Teil der Platte (4.1) befestigt ist; dass zwei Klingen (4.4), die auf die Spitze (2.1) gerichtet sind, auf dem distalen Teil der kleinen Platte (4.3) befestigt sind.

4. Stanzzange nach Anspruch 2, **dadurch gekennzeichnet, dass** die Halterung (4) eine Platte (4.1) umfasst, die teilweise in das distale Ende des Tragarms (1) eingesetzt ist und auf der ein Teil (4.31) einer kleinen L-förmigen Platte (4.3) unter einem rechten Winkel befestigt ist; wobei der Teil (4.32) der kleinen Platte (4.3), die unter einem rechten Winkel zu dem Teil (4.31) steht, angenähert die Form einer kreisförmigen Halb-Krone hat.

5. Stanzzange nach Anspruch 1, **dadurch gekennzeichnet, dass** der Betätigungsarm (2) ein geradliniges Element ist, das aus einem ersten Teil, der den Tragarm (1) flankiert, einem zweiten Teil. der angenähert unter einem rechten Winkel zu dem ersten Teil angeordnet ist, und aus einem Verbindungsteil besteht, der zwischen den anderen Teilen liegt; wobei die Spitze (2.1) an dem distalen Ende des zweiten Teils befestigt ist.

6. Stanzzange nach Anspruch 1, **dadurch gekennzeichnet, dass** der Betätigungsarm (2) ein geradliniges Element ist, der aus einem ersten Teil, der den Tragarm (1) flankiert, und einem zweiten Teil besteht, der direkt an dem ersten Teil und angenähert unter einem rechten Winkel hierzu befestigt ist, wobei die Spitze (2.1) an dem distalen Ende des zweiten Teils befestigt ist.

7. Stanzzange nach Anspruch 1, **dadurch gekennzeichnet, dass** die kleine Stange (2.3) und der Schlitz (3.14) und der Schlitz (3.14), die als Schwenkelemente während der Bewegung des Hebelarms (3) wirken, durch eine zwischen dem Tragarm (1) und dem Betätigungsarm (2) angeordnete

Feder ersetzt sind, wobei die Feder nahe an dem ersten Paar von Haltebügeln (6) in der Nähe des proximalen Endes des Tragarmes (1) angeordnet ist.

Revendications

1. Pince poinçonneuse, en particulier pour profilés métalliques, comprenant un bras de support (1), un bras de commande (2) et un brus de levier (3); le bras de support (1) est un élément rectiligne, de préférence un profilé à section ovale, ayant une extrémité proximale recouverte d'un revêtement anatomique (1.1) et une extrémité distale à laquelle un support (4) apte à accueillir partiellement le profilé métallique à poinçonner est fixé au moyen d'un bouton (5) ou d'un boulon; les extrémités d'au moins deux paires de pattes (6, 7) sont fixées à deux côtés opposés du bras de support (1) ; une première paire de pattes (6) est située à proximité de l'extrémité proximale du bras de support (1), tandis que la deuxième paire de pattes (7) est située à proximité de son extrémité distale; les pattes (6, 7) sont en regard du bras de commande (2); chaque patte (6, 7) a au moins un trou à proximité de son extrémité libre; les trous de chaque paire de pattes (6, 7) sont coaxiaux; le bras de commande (2) est un élément rectiligne et présente à son extrémité distale une partie à peu près orthogonale au bras de commande lui-même (2); une pointe (2.1) orientée vers le support (4) est fixée à l'extrémité libre dudit élément orthogonal du bras de commande (2) ; la pointe (2.1) est en forme de tronc de pyramide ou de cône et est divisée en quadrants; chaque quadrant est délimité par deux bords de coupe (2.11) allant de l'extrémité de la pointe (2.1) à sa périphérie; le bras de commande (2) est pivoté sur le bras de support (1) au moyen d'une broche constituée d'un boulon (8) logé dans les trous des extrémités libres de la première paire de pattes (6) situées à proximité de l'extrémité proximale du bras de support (1) et dans l'extrémité proximale du bras de commande (2) : le bras de commande (2) bouge entre les pattes (7) situées à proximité de l'extrémité distale du bras de support (1); le bras de levier (3) est un élément rectiligne, constitué de préférence d'un profilé tubulaire dont une extrémité proximale est recouverte d'un revêtement anatomique (3.15); un corps (3.1) en forme de came est fixé à l'extrémité distale du bras de levier (3); le bras de levier (3) est pivoté sur le bras de support (1) au moyen d'une broche constituée d'un boulon (9) logé dans les trous des extrémités libres de la deuxième paire de pattes (7) situées à proximité de l'extrémité distale du bras de support (1) et dans le corps (3.1); la pince poinçonneuse est **caractérisée en ce que** ledit corps (3.1) en forme de came a un bord rectiligne (3.11) relié à un bord curviligne (3.12); un trou (3.13) est percé en position opposée auxdits bords (3.11, 3.12); ledit trou (3.13) accueille le bouton (9) pivotant le bras de levier (3) sur le bras de support (1); une fente (3.14) périphérique suit aussi bien le bord curviligne (3.12) que le bord rectiligne (3.11); l'extrémité libre (2.31) d'une tige (2.3) fixée au bras de commande (2) est logée dans la fente (3.14); l'extrémité libre (2.31) de la tige (2.3) est pliée vers le corps; lesdits bords (3.11,3.12) du corps (3.1) du bras de levier (3) glissent sur une plaquette (2.2) fixée au bras de commande (2) à proximité de son extrémité distale et sur le côté en regard du bras de levier (3); ladite pointe (2.1) fixée à l'extrémité libre du bras de commande (2) a deux rainures (2.12) périphériques délimitant une zone (2.13) centrale, de préférence située à la même hauteur que les bords de coupe (2.11), dans chaque quadrant délimité par deux bords de coupe (2.11);

2. Pince poinçonneuse, selon la revendication 1, **caractérisée en ce que** le support (4) comprend une plaque (4.1) qui est partiellement logée dans l'extrémité distale du bras de support (1) et est fixée audit bras de support au moyen d'un bouton (5) ou d'un boulon, bloqué par un écrou, traversant un trou (4.2) de la plaque (4.1) elle-même et les trous (1.2) du bras de support (1).

3. Pince poinçonneuse, selon la revendication 2, **caractérisée en ce que** le support (4) comprend une plaque (4.1) en forme de Z, dont les trois parties sont agencées de façon orthogonale l'une par rapport à l'autre; la partie proximale est partiellement logée dans l'extrémité distale du bras de support (1); une plaquette (4.3) en forme de L est fixée de façon orthogonale à la partie centrale et à la partie distale de la plaque (4.1); deux lames (4.4) en regard de la pointe (2.1) sont fixées à la partie distale de la plaquette (4.3).

4. Pince poinçonneuse, selon la revendication 2, **caractérisée en ce que** le support (4) comprend une plaque (4.1) qui est partiellement logée dans l'extrémité distale du bras de support (1), à laquelle une partie (4.31) d'une plaquette (4.3) en forme de L est fixée de façon orthogonale; la partie (4.32) de la plaquette (4.3), agencée de façon orthogonale à la partie (4.31), est à peu près en forme de demi-couronne circulaire.

5. Pince poinçonneuse, selon la revendication 1, **caractérisée en ce que** le bras de commande (2) est un élément rectiligne constitué d'une première partie côtoyant le bras de support (1), d'une deuxième partie agencée de façon à peu près orthogonale à la première partie et d'une partie de liaison interposée entre les autres parties; la pointe (2.1) est fixée à l'extrémité distale de la deuxième partie.

6. Pince poinçonneuse, selon la revendication 1, **caractérisée en ce que** le bras de commande (2) est un élément rectiligne constitué d'une première partie côtoyant le bras de support (1) et d'une deuxième partie fixée directement à la première partie et agencée de façon à peu près orthogonale à celle-ci; la pointe (2.1) est fixée à l'extrémité distale de la deuxième partie.

7. Pince poinçonneuse, selon la revendication 1, **caractérisée en ce que** la tige (2.3) et la fente (3.14) faisant fonction d'éléments de pivotement pendant le mouvement du bras de levier (3) sont remplacées par un ressort situé entre le bras de support (1) et le bras de commande (2); ledit ressort est situé près de la première paire de pattes (6) à proximité de l'extrémité proximale du bras de support (1).

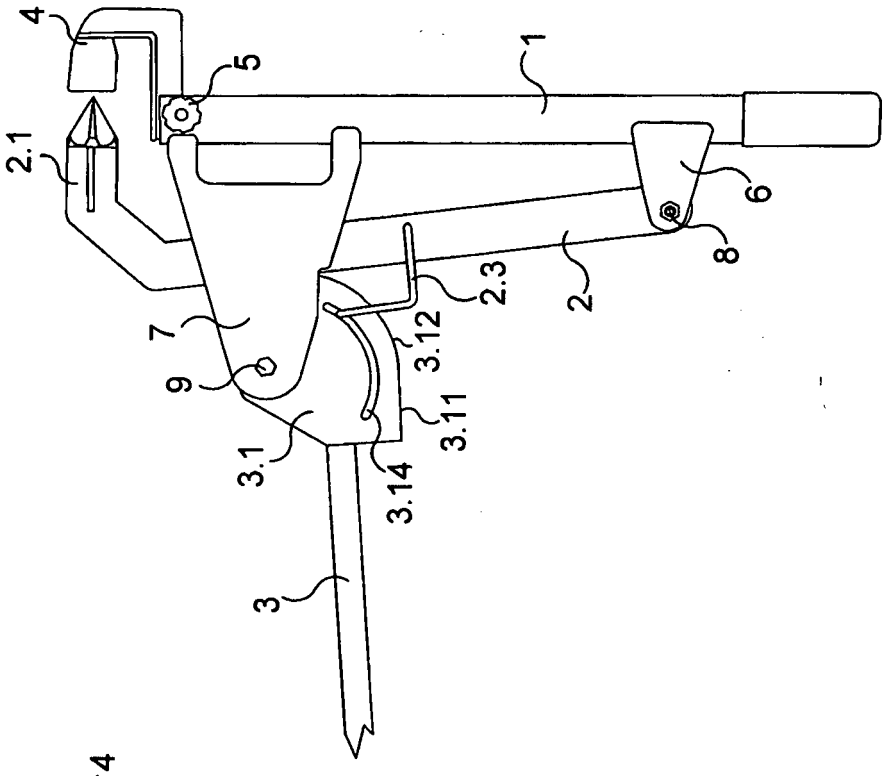

4
5
1
2.1
6
8
2.3
2
7
3.12
9
3.11
3.1
3.14
3

FIG. 2

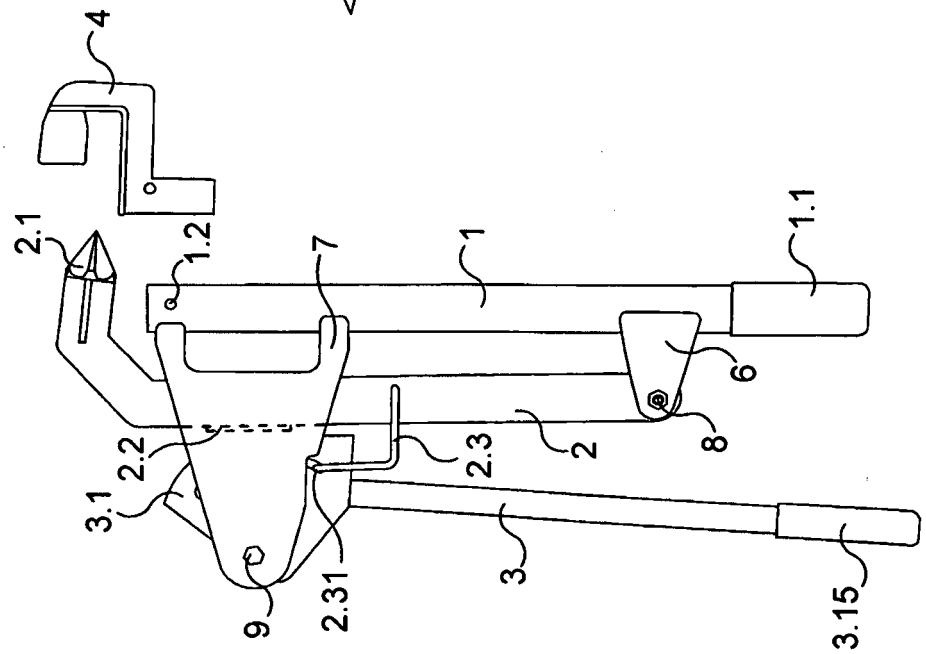

4
2.1
1.2
7
1
1.1
6
8
2.2
2.3
2
3.1
3
9
2.31
3.15

FIG. 1

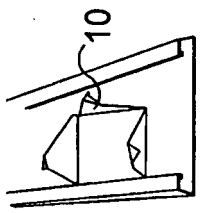


FIG. 7

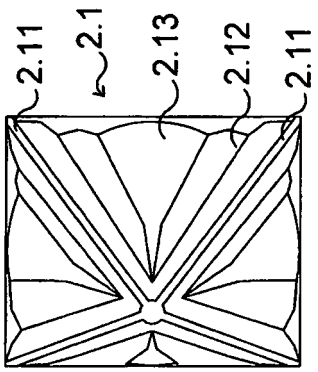


FIG. 6

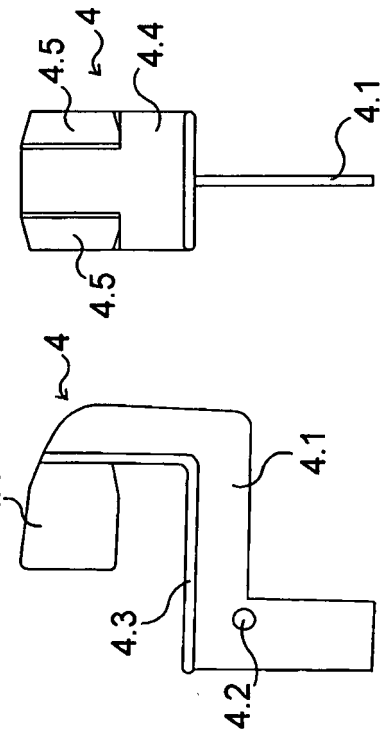


FIG. 4

FIG. 3

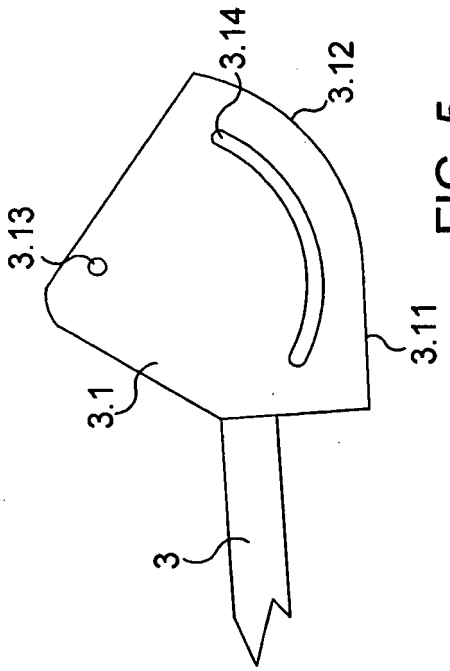


FIG. 5

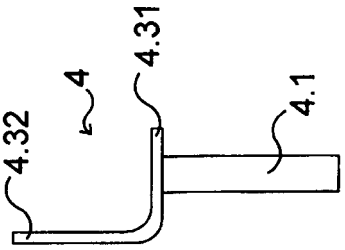


FIG. 9

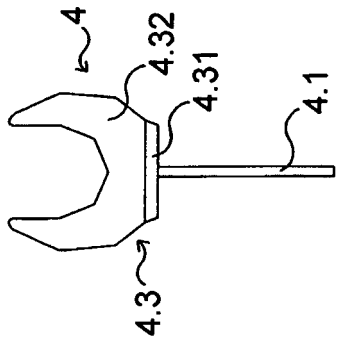


FIG. 8

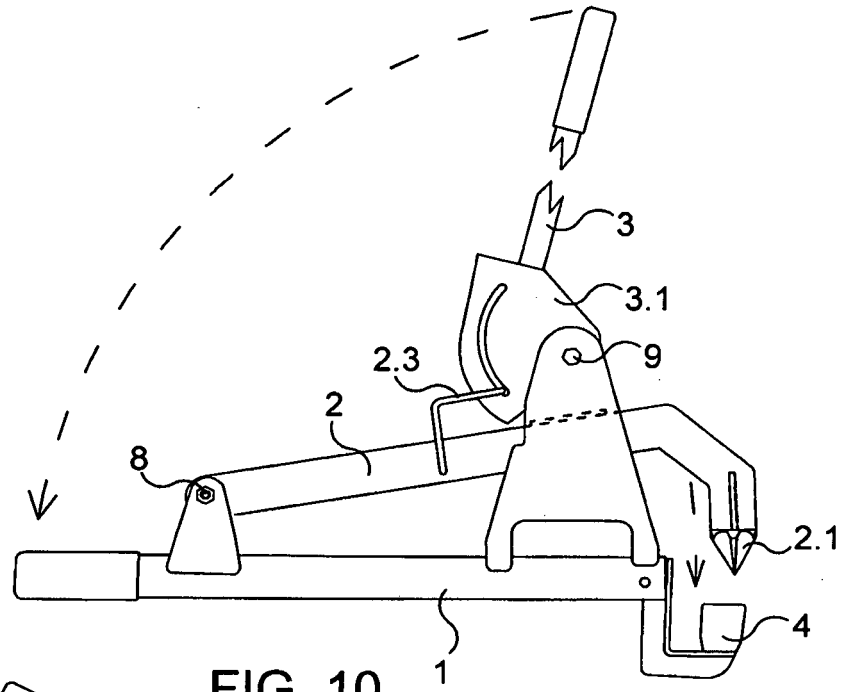


FIG. 10

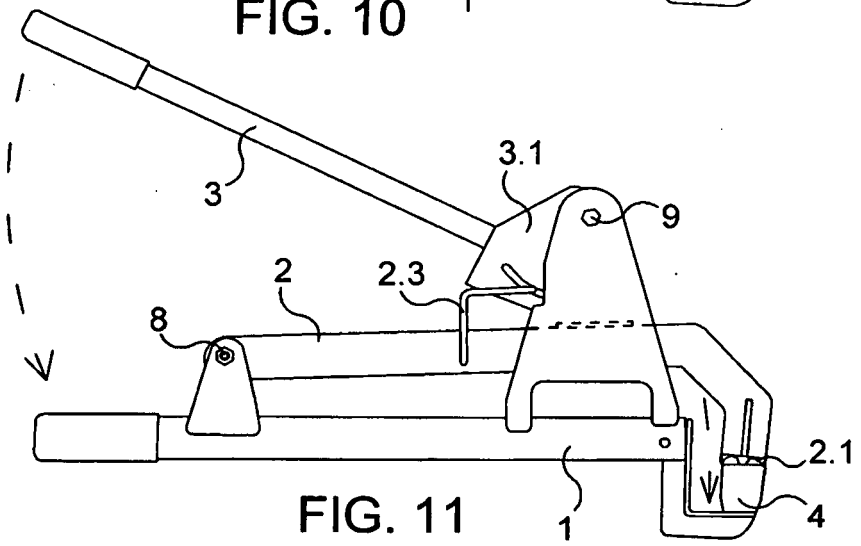


FIG. 11

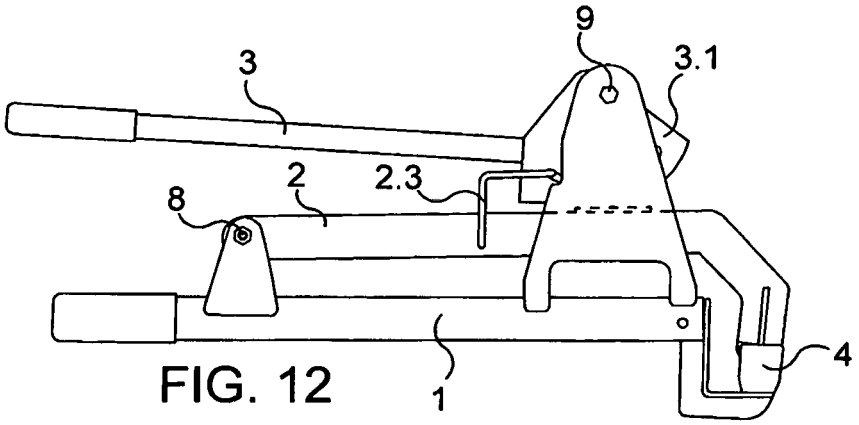


FIG. 12

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- US 5287716 A **[0005]**
- US 345687 A **[0007]**