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(54) **Device for forming a profiled edge on one end of a tubular member**

Vorrichtung zur Formung eines polierten Randes an ein Rohr

Appareillage pour la formation d'un bord profilé à un tuyau

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US-A- 2 498 686 US-A- 4 862 719**

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Description

[0001] The invention relates to a device for forming a profiled edge on one end of a tubular member, said device comprising a tabletop and two cooperating profiling rolls, which project above said tabletop.

[0002] Such a device, as for example known from GB-A-2 270 021, is generally used for forming an edge of L-shaped or Z-shaped section on the end of a tubular member, wherein the L-shaped edge formed on a tubular member can be placed in the Z-shaped edge formed on another tubular member, after which the Z-shaped edge can be folded over the L-shaped edge so as to connect the two tubular members.

[0003] With the prior art devices, the end of the tubular member on which the profiled edge is to be formed must be held down on the upper surface of the tabletop by hand, whilst the respective end of the tubular member moves between the profiling rolls. Holding down a tubular member, on which a profiled edge is to be formed, by hand in this manner is difficult and requires comparatively much force, which has an adverse effect on the production capacity.

[0004] According to the invention, the device comprises two guide rollers for the tubular member, which guide rollers engage the wall of the tubular member during operation at points located at least substantially opposite each other, and wherein the axis of rotation of at least one of said guide rollers includes an angle deviating from 90° with the upper surface of the tabletop.

[0005] By using the construction according to the invention, the tubular member, on which a profiled edge is to be formed, will be pressed against the upper surface of the tabletop by means of said guide rollers, so that this no longer needs to be done by the operator of the device, relieving the operator of a strenuous activity and enhancing the accuracy of the operation of the device.

[0006] The invention will now be explained in more detail with reference to the accompanying figures.

[0007] Figure 1 schematically shows a tubular member provided with an edge of L-shaped section.

[0008] Figure 2 is a schematic, sectional view of a tubular member provided with an edge of Z-shaped section.

[0009] Figure 3 schematically shows the connected tubular members of Figures 1 and 2.

[0010] Figure 4 is a schematic top plan view of a part of the device according to the invention.

[0011] Figure 5 is a view of Figure 4, seen in the direction along line V-V, from which the profiling rolls of the device have been left out.

[0012] Figure 6 is a top plan view of one of the guide rollers with an associated support.

[0013] Figure 7 is a side view of Figure 6.

[0014] Figure 8 is a side view of Figure 7.

[0015] Figure 9 is a top plan view of another one of the guide rollers and its support.

[0016] Figure 10 is a side view of Figure 9.

[0017] Figure 11 is a side view of Figure 10.

[0018] To interconnect two tubular members 1 (Figure 1) and 2 (Figure 2), tubular member 1 is provided with an outwardly folded flange 3 at one end, so that the respective profiled edge of tubular member 1 will be of substantially L-shaped section.

[0019] The other tubular member 2 is deformed in such a manner as to comprise an outwardly projecting flange portion 4 and an adjoining wall portion 5, which extends concentrically with tubular member 2, so that the profiled end of the tubular member 2 will be of substantially Z-shaped section.

[0020] As is furthermore shown in Figure 3, flange 3 of tubular member 1 can be placed on flange 4 of tubular member 2 so as to interconnect the two tubular members 1 and 2, after which wall portion 5 is folded over flange 3 so as to connect tubular members 1 and 2 in this manner.

[0021] Although the embodiment of Figures 1 - 3 shows the two tubular members 1 and 2 being connected in such a manner that the central axes of the tubular members 1 and 2 are in line, it is also possible, as is generally known in the art, to connect said tubular members in a similar manner, such that the central axes of the two tubular members 1 and 2 include an angle with each other. To this end the tubular members are cross-cut, prior to the profile being formed on the respective ends, along a plane that includes a desired angle deviating from 90° with the central axis of a respective tubular member.

[0022] The forming of the profiled edges of the tubular members takes place in a well-known manner by means of a machine including a tabletop 6, above which two drivable profiling rolls 7 and 8 are disposed. The profiling rolls 7 and 8 are circumferentially provided with a suitable profile for forming one of the above-indicated profiled edges at one end of a tubular member 9 as schematically indicated by means of a circle in Figure 4. The end of said tubular member 9 that rests on tabletop 6 is passed between rolls 7 and 8 during operation as a result of rolls 7 and 8 being driven in the direction indicated by arrow A. Tubular member 9 is furthermore guided by a supporting roller 10 in a manner which is known per se, which supporting roller is freely rotatable on the end of an arm 11, which arm is movable in longitudinal direction and which can be fixed in several positions with respect to the frame of the device (not shown) for adaptation to the outside diameter of the tubular member 9 to be worked.

[0023] According to the invention, the device comprises two guide rollers 12 and 12', which are disposed slightly upstream of the profiling rolls 7 and 8, seen in the intended direction of movement of tubular member 9.

[0024] As is shown in more detail in Figures 6 - 8, the guide roller 12 that is disposed in the interior of the tubular member 9 to be worked, seen in Figure 4, is freely

rotatable on a shaft 13, which is fixed to an L-shaped support 14.

[0025] Support 14 and a plate 16 carrying support 14 are jointly coupled to an L-shaped arm 17 by means of a pivot pin 18, the central axis of which intersects the axis of guide roller 12 perpendicularly.

[0026] As is apparent in particular from Figure 8, a slot 19 extending concentrically about the central axis of pin 18 is formed in plate 16. Through said slot 19 a bolt can be passed, which bolt can be screwed into a threaded hole 20 formed in one leg of L-shaped arm 17, by means of which plate 16 can be clamped down in a desired position, pivoted about pivot pin 18, with respect to arm 17.

[0027] The leg of L-shaped arm 17 that extends perpendicularly to the leg of the L-shaped arm against which plate 16 can be clamped is provided with a slotted hole 21, which extends in the longitudinal direction of the leg in question. L-shaped arm 17 is thereby supported by a block 22 attached to the frame of the device (not shown). Arm 17 can be moved in its longitudinal direction with respect to said block and be clamped down in a desired position by means of a bolt (not shown) that is passed through slotted hole 21, which bolt can be screwed into a threaded hole 23 that is formed in block 22.

[0028] As is shown in more detail in Figure 6, block 22 may furthermore be provided with a graduation 24 for cooperation with a mark 25 on arm 17, which makes it easier to adjust the guide wheel 12 correctly in accordance with the diameter of a tubular member 9 to be worked.

[0029] Guide roller 12' is freely rotatable about a shaft 26, which is attached to an L-shaped support 27. Support 27 is connected with a plate 28 carrying said support, to a supporting member 30 by means of a pivot pin 29. Supporting member 30 is movably supported, by means of two guide pins 31 extending parallel to pivot pin 29, by a guide block 32 attached to the frame of the device (not shown).

[0030] The central axis of pivot pin 29 intersects the central axis of the shaft 26 supporting the guide wheel 12' perpendicularly.

[0031] As is apparent from Figure 11, two slotted holes 33 extending concentrically about pivot pin 29 are formed in plate 28. The supporting member 27 that supports wheel 12' and plate 28 can be pivoted about pivot pin 29 and be clamped down in a desired position with respect to supporting member 30 by means of bolts (not shown) that are passed through slotted holes 33, which bolts are screwed into threaded holes 34 formed in said supporting member.

[0032] As is indicated by means of double arrow B in Figure 1, supporting member 30 and the guide roller 12' connected therewith can be moved forward and backward in a direction perpendicularly the axis of rotation of guide roller 12' by means of a pneumatically or hydraulically operating setting cylinder (not shown).

[0033] As will furthermore be apparent from Figure 4,

the imaginary line 35 extending perpendicularly to the axis of rotation of guide roller 12, along which guide roller 12 can move forward and backward, is slightly staggered with respect to the imaginary line 36 extending perpendicularly to the axis of rotation of guide roller 12, along which the guide roller 12 and the arm 17 carrying said guide roller 12 are movable. As is furthermore shown in Figure 4, the guide roller 12 is positioned in such a manner that it abuts against the inside wall of the tubular member 9 to be worked, whilst guide roller 12' is held in abutment with the outer circumference of the tubular member 9 to be worked, at a point which is located substantially opposite the point of contact of guide roller 12 with the inner circumference of tubular member 9, albeit slightly more upstream during operation, seen in the direction of rotation of the tubular member as indicated by arrow A.

[0034] Guide rollers 12 and 12' are furthermore positioned in such a manner that the axes of rotation of guide rollers 12 and 12' do not extend perpendicularly to the upper side of tabletop 6, but include an angle therewith, which makes it possible to have the guide rollers 12 and 12', which make contact with the wall of the tubular member 9, exert a force on the tubular member 9 in the direction of the tabletop 6 during their rotation about their axes of rotation when tubular member 9 is moved in the direction indicated by arrow A. As a consequence of that, the end of the tubular member facing towards the tabletop 6, on which a profile is to be formed, will be held down on the tabletop 6 without human interference during the movement of the end of tubular member 9, on which a profile is to be formed, between profiling rolls 7 and 8.

Claims

1. A device for forming a profiled edge on one end of a round tubular member (9), said device comprising a tabletop (6) and two cooperating profiling rolls (7,8), which project above said tabletop, **characterized in that** the device comprises two guide rollers (12, 12') for the tubular member, which guide rollers engage the wall of the tubular member during operation at points located at least substantially opposite each other, and wherein the axis of rotation of at least one of said guide rollers includes an angle deviating from 90° with the upper surface of the tabletop (6).
2. A device according to claim 1, **characterized in that** the axes of rotation of the two guide rollers (12, 12') include an angle deviating from 90° with the upper surface of the tabletop (6).
3. A device according to claim 1 or 2, **characterized in that** the angle which the axis of rotation of a guide roller (12, 12') includes with the upper surface of the

tabletop (6) is adjustable.

4. A device according to any one of the preceding claims, **characterized in that** the guide rollers (12,12') are capable of reciprocating movement in a direction perpendicularly to their axes of rotation and that said guide rollers can be adjusted in a desired position.
5. A device according to any one of the preceding claims, **characterized in that** the point of contact of the guide roller (12') that engages the outer circumference of the tubular member (9) to be worked is located before the point of contact of the guide roller (12) that engages the inner circumference of the tubular member (9), seen in the intended direction of movement of the tubular member to be worked.

Patentansprüche

1. Vorrichtung zur Ausbildung eines profilierten Rands an einem Ende eines runden rohrförmigen Elements (9), wobei die Vorrichtung eine Tischplatte (6) und zwei zusammenwirkende Profilierungsrollen (7, 8) aufweist, die über die Tischplatte vorstehen, **dadurch gekennzeichnet, dass** die Vorrichtung zwei Führungsrollen (12, 12') für das rohrförmige Element aufweist, welche die Rollen beim Eingriff mit der Wand des rohrförmigen Elements während des Betriebsablaufs in Punkten führt, die zumindest im wesentlichen einander gegenüber liegen, und wobei die Drehachse von zumindest einer der Führungsrollen einen um 90° von der Oberseite der Tischplatte (6) abweichenden Winkel einschließt.
2. Vorrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass** die Drehachsen der beiden Führungsrollen (12, 12') einen Winkel aufweisen, der um 90° von der Oberseite der Tischplatte (6) abweicht.
3. Vorrichtung nach Anspruch 1 oder 2, **dadurch gekennzeichnet, dass** der Winkel, den die Drehachse der Führungsrolle (12, 12') mit der Oberseite der Tischplatte (6) einschließt, einstellbar ist.
4. Vorrichtung nach einem der vorangehenden Ansprüche, **dadurch gekennzeichnet, dass** die Führungsrollen (12, 12') in einer Richtung senkrecht zur ihrer Drehachse hin- und herlaufen können, und dass die Führungsrollen in einer gewünschten Position eingestellt werden können.
5. Vorrichtung nach einem der vorangehenden Ansprüche, **dadurch gekennzeichnet, dass** der Kon-

taktpunkt der Führungsrolle (12'), die mit dem Außenumfang des zu bearbeitenden rohrförmigen Elements (9) im Eingriff steht, vor dem Kontaktpunkt der Führungsrolle (12) zu liegen kommt, die mit dem Innenumfang des rohrförmigen Elements (9) im Eingriff steht, gesehen ausgehend von der Soli-Bewegungsrichtung des zu bearbeitenden rohrförmigen Elements.

Revendications

1. Dispositif pour former un bord profilé au niveau d'une extrémité d'un élément tubulaire rond (9), ledit dispositif comprenant un plateau (6) et deux rouleaux de profilage (7, 8) qui coopèrent mutuellement et dépassent au-dessus dudit plateau (6), **caractérisé en ce que** le dispositif comprend deux rouleaux de guidage (12, 12') pour l'élément tubulaire, lesdits rouleaux de guidage engageant la paroi de l'élément tubulaire pendant l'opération en des points situés au moins sensiblement en face l'un de l'autre, et **en ce que** l'axe de rotation d'au moins un desdits rouleaux de guidage présente un angle qui dévie de 90° avec la surface supérieure du plateau (6).
2. Dispositif selon la revendication 1, **caractérisé en ce que** l'axe de rotation de chacun des deux rouleaux de guidage (12, 12') présente un angle qui dévie de 90° avec la surface supérieure du plateau (6).
3. Dispositif selon la revendication 1 ou 2, **caractérisé en ce que** l'angle formé par l'axe de rotation d'un rouleau de guidage (12, 12') et la surface supérieure du plateau (6) est réglable.
4. Dispositif selon l'une quelconque des revendications précédentes, **caractérisé en ce que** les rouleaux de guidage (12, 12') sont capables d'un mouvement alternatif dans une direction perpendiculaire à leurs axes de rotation et **en ce que** la position desdits rouleaux de guidage est réglable.
5. Dispositif selon l'une quelconque des revendications précédentes, **caractérisé en ce que** le point de contact du rouleau de guidage (12') qui engage la circonférence extérieure de l'élément tubulaire (9) à travailler est situé avant le point de contact du rouleau de guidage (12) qui engage la circonférence intérieure de l'élément tubulaire (9) vu dans la direction de mouvement prévue de l'élément tubulaire à travailler.

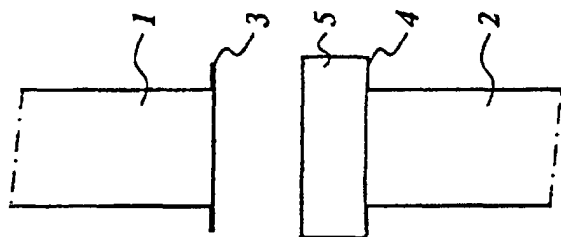


Fig. 1

Fig. 2

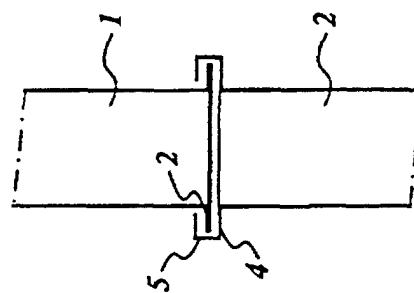


Fig. 3

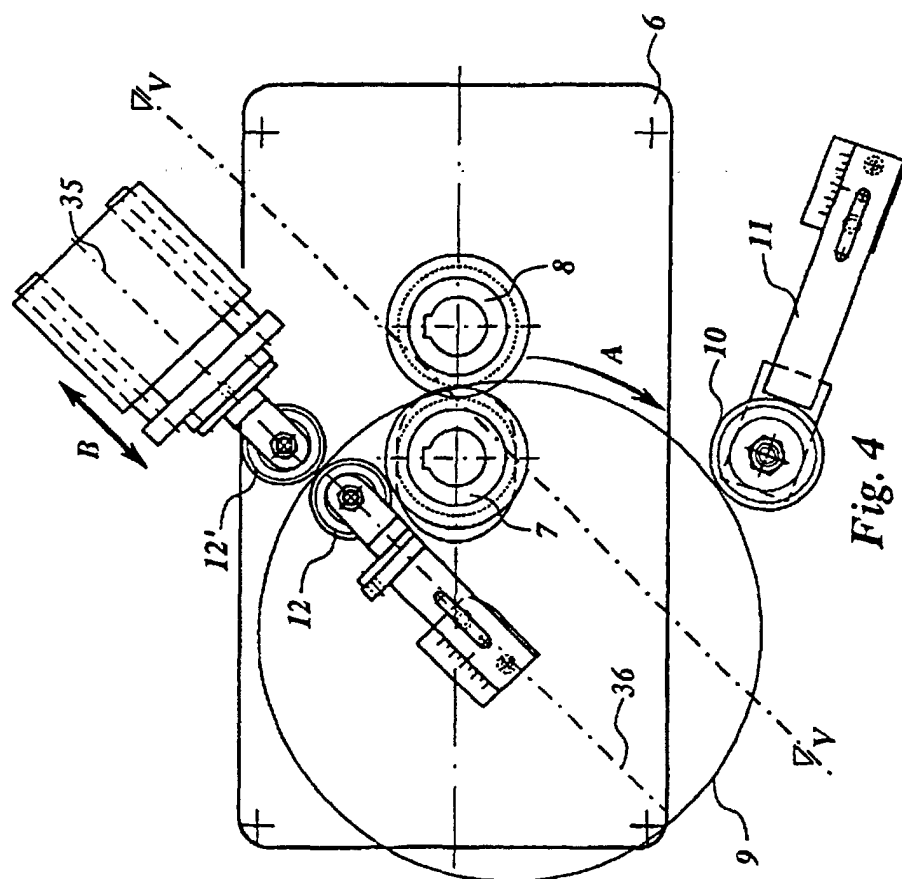


Fig. 4

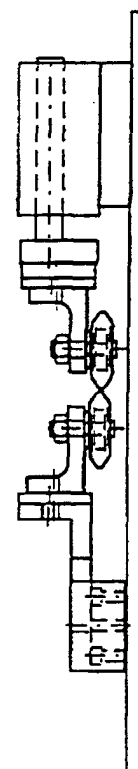


Fig. 5

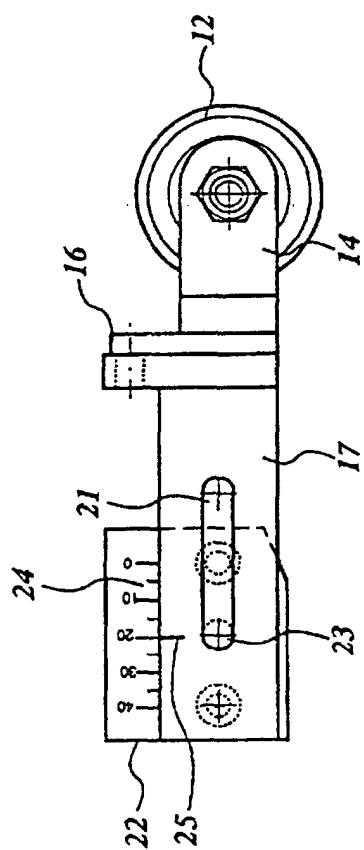


Fig. 6

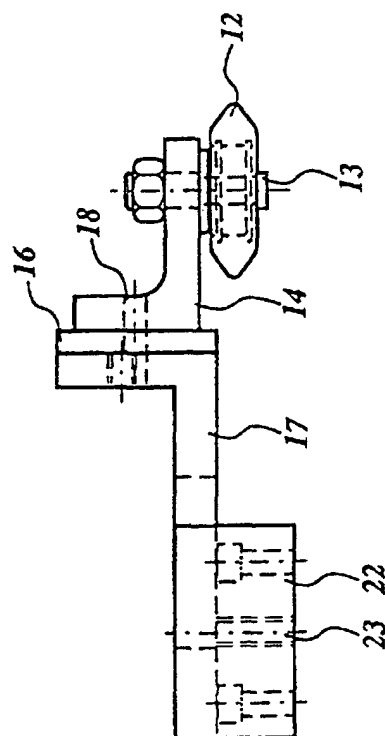


Fig. 7

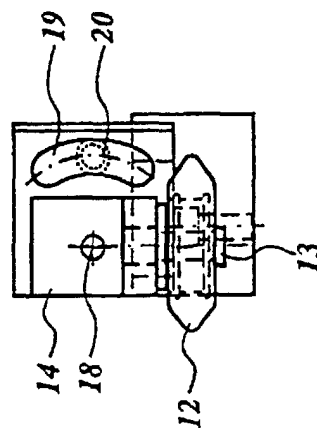


Fig. 8

