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SAMPLE SCRIPT A

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A GRIPPING TOOL

The invention relates to a gripping tool and, in particular, a pipe gripper.

Domestic pipes typically have a threat cut on the end, and a fitting or connector is screwed directly on to the end. Whilst commonplace spanners may be used to grip the pipe, they can be ineffective at preventing the pipe from twisting when a connector is screwed on to the thread cut.

Pliars are also used for this purpose. A known design of pliar is shown in Fig. 2. It can be seen that jaw 112 and jaw 118 meet at a pivot 128 where they then turn in to handle 122 and handle 114, respectively. In order that the pipe is prevented from twisting, the handles must be squeezed together with a tight grip. Whilst the amount of force required may be reduced by providing elongated handles, this leads to a problem for users with smaller hands, and may require two-hander operation. Furthermore, the pipes are frequently crushed when too much gripping force is applied.

The invention solves one or more of the above problems. Although the gripping tool of the invention is particularly useful for gripping pipes and other smooth cylindrical objects, it may be used for a variety of purposes where tight gripping or claming is required.

According to a first aspect of the invention, there is provided [Claim 1]. Thus, the pipe is gripped without the need to squeeze two handles together, as in pliars. Indeed, the gripper may be operated with one hand.

Preferably, the gripper [insert features of Claim 2]. The spring helps the jaws to both slightly grip the pipe before a downward force is applied to the handle, and to release the grip on the pipe as the downward pressure is released from the handle.

Preferably, the gripper [insert features of Claim 3]. This allows one tool to be used on many diameters of pipe. A simple way to achieve this is to provide a gripper [insert features of Claim 4].

Preferably, the gripper [insert features of Claim 5]. More preferably such a gripper [insert features of Claim 6]. This provides the same advantages as when the spring is directly attached to the arm in the fixed arm system. Alternatively, or additionally, the gripper [insert features of Claim 7]. This lower spring further assists with release of the jaws grip on the pipe when the downward force is removed.

Preferably, the gripper [insert the features of Claim 8]. This prevents the pipe being crushed.

Preferably, the gripper [insert the features of Claim 9]. This gives a very tight grip on the pipe.

Preferably, the gripper [insert the features of Claim 10]. This increases the initial purchase or grip on the pipe surface.

Preferably, the gripper [insert the features of Claim 11]. Plastic jaws are better at engaging with plastic and copper pipes.

The invention will now be described, by way of example, with reference to the accompanying figures, in which:

Fig. 1 shows a perspective view of an example of a pipe gripper in accordance with the present invention.

Fig. 2 shows a side view of a prior art pair of pliars.

Fig. 3 shows a cross-section of the front portion of the gripper of Fig. 1.

Fig. 4 shows a side view of the front portion of the gripper of fig. 1, engaged with a pipe.

Throughout the figures, life reference numerals are used to denote like features.

Fig. 1 shows a pipe gripper 10 with an outer jaw 10 having a downwardly extending arm 14 which slides in a collar 16. The collar 16 is also attached to an inner jaw 18 having a handle 22. The arm 14 has a screw thread on its upper and lower edges and a circular nut 20 rotates on the screw thread. The nut 20 sits in a socket or window in the collar 16, and the arm 15 moves in and out of the collar 16 as the nut 20 is rotated.

In Fig. 1, the jaws are shown as having teeth on the jaw faces. However, other features may be used to provide the jaws with roughened faces, such as crenulations, waves or even spikes.

Unlike the pliers in Fig. 2, the gripper 10 of Fig. 1 has a single handle 22 which may be used to operate gripper 10.

The inner jaw 18 is formed on handle 22 as one piece. However, this does not have to be the case.

The collar 16 is pivoted on the inner jaw 18 and handle 22 with a pivot 28. This gives the gripper 10 the strong gripping action. The device is also shown with an upper spring 24 and a lower spring 26. Each spring is shown as a spring leaf and joins the handle 22 to the collar 16.

To use the gripper 10, the nut 14 is rotated to adjust the space between jaws 12 and 18 until the jaw faces are at a distance from one another about the same as the diameter of the pipe to be held.

The jaws 12, 18 may then be pushed around a pipe. The springs 24, 26 allow the jaws to slightly widen if required.

Figs. 3 and 4 show a larger scale view of the mechanism. Pulling down on the handle 22 causes the inner jaw 18 to roll on the surface of the pipe 30. The outer jaw 12 already has grip on the surface of the pipe 30, enhanced by the presence of teeth, so it doesn't slide around the pipe 30. Instead, the outer jaw 12 is pulled towards the inner jaw 18 because the jaws are connected by the pivot 28 above the contact point with the pipe 30. This gives a very tight grip.

A long handle 22 is used to achieve a lot of leverage, to hold the pipe fast or rotate it with considerable force.

Fig. 4 shows the jaw faces becoming closer to parallel as the pipe 30 is gripped.

CLAIMS:

1. A pipe gripper comprising:

an outer jaw extending from an arm;

an inner jaw spaced apart from and facing the outer jaw, and extending from a handle;

wherein the arm of the outer jaw is connected to a pivot located behind the inner jaw;

such that, in use, the inner jaw and outer jaw are placed around a pipe and a downward force on the handle moves the inner jaw and outer jaw together to grip the pipe.

- 2. The pipe gripper of Claim 1, further comprising a spring attached at one end to the arm and at the other end to the handle.
- 3. The pipe gripper of Claim 1, further comprising a jaw spacer to adjust the space between the inner jaw and outer jaw.
- 4. The pipe gripper of Claim 3, wherein the arm is threaded, and the jaw spacer is a nut.
- 5. The pipe gripper of Claim 3 or 4, wherein the jaw spacer is housed in a collar through which the arm and the handle pass, and the collar is connecting the arm of the outer jaw to the pivot.
- 6. The pipe gripper of Claim 5, further comprising an upper spring attached at one end to the collar and at the other end to the upper side of the handle.
- 7. The pipe gripper of Claim 5 or 6, further comprising a lower spring attached at one end to the collar and at the other end to the lower side of the handle.
- 8. The pipe gripper of any one of the preceding claims, wherein the inner jaw abuts the arm of the outer jaw to limit the extent to which the inner jaw and outer jaw come together when the downward force is applied to the handle.
- 9. The pipe gripper of any one of the preceding claims, wherein the inner jaw and outer jaw form a slight V shape such that, in use, the inner jaw rotates about a contact point on the pipe and the inner jaw and outer jaw move closer to parallel.
- 10. The pipe gripper of any one of the preceding claims, wherein the inner jaw and outer jaw are roughened.
- 11. The pipe gripper of any one of the preceding claims, wherein the inner jaw and outer jaw are made of plastic.
- 12. A pipe gripper substantially as described herein, with reference to figs. 1, 3 and 4.

ABSTRACT

A Pipe Gripper

A pipe gripper 10 comprises an outer jaw 12 extending from an arm 14, and an inner jaw 18 spaced apart from and facing the outer jaw 12, and extending from a handle 22. The arm 14 of the outer jaw 12 is connected to a pivot 28 located behind the inner jaw 18, such that, in use, the inner jaw 18 and outer jaw 12 are placed around a pipe and a downward force on the handle 22 moves the inner jaw 18 and the outer jaw 12 together to grip the pipe. A pipe can therefore be gripped without the need to tightly squeeze two handles together.



Three pages of drawings follow



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SAMPLE SCRIPT B

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Pipe Gripping Tool

The present invention relates to a pipe gripping tool.

It is sometimes necessary to grip pipes, for example so as to stop the pipe from twisting when a connector is screwed onto the end of the pipe or when manipulating the pipe so that it mates with a connector. However, it can be difficult to grip pipes adequately since they tend to be round and therefore have no edges to resist rotation.

Referring to Fig. 1, traditionally pliars 3 have been used to grip pipes between their jaws 28. The jaws 28 are closed by squeezing handles 32.

However, pliers require a large hand span in order to grip large pipes, and also require a strong hand grip to be able to apply enough force to the pipe to prevent the pipe from slipping when rotating the pliars relative to the pipe. When working with more pliant pipes, there is also the danger that the pipe will be crushed when the handles of the pliars are squeezed together.

There remains, therefore, scope for providing an improved tool for gripping pipes.

According to the present invention there is provided a pipe gripping tool as claimed in claim 1. The tool is advantageous in that rotation of the tool naturally leads to the grip on a pipe being increased. There is therefore no need to have a strong hand grip to be able to adequately grip a pipe.

Preferably, the tool has the features of claim 2. The faces of the jaws moving to a more parallel arrangement allows the pipe to straightforwardly be inserted into the jaws before the pipe is gripped. Preferably, the tool has the features of claim 3. The elongated handle provides a greater lever arm, so as to be able to easily rotate a pipe or prevent a pipe from rotating.

Preferably, the tool has the features of claims 4, 5, 6 or 7. Biasing the inner jaw with respect to the outer jaw can maintain the jaws in a 'ready' position so that the tool can be fitted onto a pipe and lifted off a pipe using only one hand, whilst still allowing the jaws to move.

Preferably, the tool has the features of claims 8 and 9. The roughened surfaces on the faces of the jaws increase the grip on the pipe. Teeth may be provided where more grip is needed.

Preferably, the tool has the features of claim 10. Allowing the jaws to translate towards and away from each other allows the tool to be used with a variety of different sizes of pipe, and removes the need to carry around a number of tools for different sizes of pipe.

Preferably the tool has the features of claim 11. This arrangement provides a convenient way of being able to translate the jaws of the tool, and once translated to maintain the jaws in their new position.

Preferably the tool has the features of claim 12. Plastics are particularly preferred when used with plastic or copper pipes to reduce the chances of damaging the pipe with the tool.

Preferably the tool has the features of claim 13. As the tool of the present invention may be operated using only one hand, the tool need only be provided with one handle in some embodiments.

Preferably, the tool has the features of claim 14. Limiting the rotation of the jaws with respect to one another in this way reduces the chances of inadvertently crushing the pipe whilst the pipe is being gripped and the tool is being rotated.

According to the present invention there is also provided a kit of parts as claimed in claim 15. The tool of the present invention may therefore be provided with pipes for use with the tool.

An embodiment of the present invention will now be described by way of example only and with reference to the accompanying figures in which:

Figure 1 illustrates a pair of pliars according to the prior art; Figure 2 is a perspective view of a pipe gripping tool according to an embodiment of the present invention; Figure 3 is a cross-sectional view of the pipe gripping tool of figure 2; and Figure 4 is a side view of the pipe gripping tool of Figure 2.

Referring now to figure 2, the tool 1 has an inner jaw 2 which is connected to an elongated handle 20. Provided opposite the inner jaw 2 is an outer jaw 4. Both of the jaws are provided with teeth on their respective faces 6, 8 for gripping a pipe.

The inner jaw 2 and outer jaw 6 are pivoted with respect to one another by a pivot 10.

The outer jaw is connected to an arm 18, which extends substantially perpendicular to the face of the outer jaw 8. The arm 18 is threaded and receives a nut 16. The nut 16 can be translated along the arm 18 by rotating the nut 16.

The nut 16 is housed in an opening or window in a collar 12. Translation of the nut 16 therefore causes translation of the collar 12 towards and away from the outer jaw 4.

The pivot 10 is provided through the collar 10 and the inner jaw 2 so that the inner jaw 2 is pivotally connected to the outer jaw 2.

The inner jaw 2 and its handle 20 are biased in position by leaf springs 22 and 24. Leaf spring 22 rotationally biases the inner jaw 2 towards the outer jaw 6, and leaf spring 24 rotationally biases the inner jaw 2 away from the outer jaw 4.

Referring now to figures 3 and 4, the tool 1 is operated by placing a pipe 30 between the jaws. The handle 20 is then rotated downwards (as indicated by the arrow). This action causes the inner jaw 2 to rotate towards the outer jaw 4, thereby gripping the pipe 30.

The distance between the jaws can be adjusted by rotating the nut 16 so as to accommodate different sized pipes 30.

CLAIMS:

- 1. A pipe gripping tool comprising an inner jaw and an outer jaw connected together by a pivot, the pivot being positioned behind the face of the inner jaw such that when a pipe is positioned between the inner and outer jaws and the tool is rotated the inner and outer jaws move towards one another to increase the grip on the pipe.
- 2. A tool as claimed in claim 1, wherein the pivot is positioned such that when the inner and outer jaws move towards one another the faces of the jaws move from being less parallel to one another to being more parallel to one another.
- 3. A tool as claimed in claim 1 or 2, wherein the inner jaw is connected to an elongated handle.

- 4. A tool as claimed in claim 1, 2 or 3, wherein the inner jaw is rotationally biased towards the outer jaw.
- 5. A tool as claimed in claim 4, wherein the inner jaw is rotationally biased towards the outer jaw by a leaf spring.
- 6. A tool as claimed in any preceding claim, wherein the inner jaw is rotationally biased away from the outer jaw.
- 7. A tool as claimed in claim 6, wherein the inner jaw is rotationally biased away from the outer jaw by a leaf spring.
- 8. A tool as claimed in any preceding claim, wherein the faces of the inner and outer jaws are roughened.
- 9. A tool as claimed in any preceding claim, wherein the faces of the inner and outer jaws are provided with teeth.
- 10. A tool as claimed in any preceding claim comprising means for translating the inner jaw and the outer jaw towards and away from one another.
- A tool as claimed in claim 10 wherein the means for translating comprises:
 a threaded arm connected to the outer jaw;
 a collar connected to the inner jaw by the pivot; and
 a nut housed in a window in the collar, the threaded arm being received by the nut.
- 12. A tool as claimed in any preceding claim, wherein the tool is made of metal and/or plastic.
- 13. A tool as claimed in any preceding claim comprising only one handle.
- 14. A tool as claimed in any preceding claim wherein rotation of the inner jaw with respect to the outer jaw is limited so as to maintain a minimum gap between the inner and outer jaws.
- 15. A kit of parts comprising: a tool as claimed in any preceding claim; and one or more pipes.
- 16. A pipe gripping tool substantially as described herein with reference to figures 2, 3 and 4.

ABSTRACT

A pipe gripping tool 1 comprising an inner jaw 2 and an opposed outer jaw 4. The inner and outer jaws are connected together by a pivot 10. The pivot 10 is positioned such that when the tool 1 is rotated by its handle 20, the inner jaw 2 rotates about the pivot 10, to close the gap between the inner and outer jaws so as to grip a pipe (30, fig. 4). The tool 1 can be operated using only one hand.



3 pages of drawings follow







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SAMPLE SCRIPT C

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Gripping Tool

A gripping tool, and in particular a tool for gripping pipes used in plumbing.

When installing, removing or adjusting domestic pipes, for example gas or water pipes, it is often necessary to grip the pipe securely. For example, when connecting a connector with a screw thread, a spanner is used to turn the connector, but this can cause the pipe to twist. Therefore, it is necessary to grip the pipe securely near to the connector to prevent the pipe twisting. Another example is that pipes might need to be twisted to ease the end into a pipe connector without crushing the pipe.

It is possible to use a pair of pliers as in Fig. 2 to grip the pipe securely in some circumstances. However, if pliers are used, a wide hand span is needed to hold the handles when gripping large pipes, and a strong grip is needed to hold the pipe securely. It is also difficult to prevent the pipe from crushing if it is made from soft materials like plastic or copper.

In light of the foregoing, it would be desirable to provide a gripping tool to facilitate gripping of a pipe and overcome at least some of the above-mentioned problems.

According to an aspect of the present invention, there is provided a gripping tool according to claim 1. This has the advantage that when the two jaws are arranged either side of a pipe, pressure on the handle causes the second jaw to close on the first jaw due to being pivoted behind the first jaw. Therefore, one handed operation is easily managed without the need to squeeze handles together.

In a preferred embodiment the separation of the jaws may be adjustable so that the tool can be used for gripping different sized pipes.

In another preferred embodiment, the arm of the second jaw may be slidably connected to a collar. The collar being pivotally connected the handle, behind the first jaw. The arm being lockable to the collar. This allows the arm to slide through the collar to adjust the separation of the jaws for fitting around different sized pipes, and then lock it in position.

Preferably, the locking mechanism is a threaded nut located on the collar engageable with a thread on the arm. This allows for easy adjustment of the jaws by simply turning the nut.

Preferably, the first jaw is arranged to abut the arm when the jaws are closed. This prevents the jaws from completely closing and so prevents the pipe from being crushed.

The jaws may be urged together by a spring, for example a leaf spring, so that one handed operation is facilitated because the jaws will start to grip as soon as they are engaged with a pipe.

The jaws, particularly the faces of the jaws, may have a roughened surface. This will help the jaws grip a pipe during the initial stages of gripping.

Preferably the jaws have teeth to grip the pipe.

The jaws may be made of plastic or metal depending on the type of pipe to be gripped. Plastic jaws may be more suitable for plastic or copper pipes for example.

A second spring may be arranged to urge the jaws apart when they are in the fully closed position. This helps to release the jaws from the pipe when the pressure on the handle is released. The spring could, for example, be a leaf spring.

Preferably, the handle is elongate so that it is easy to grip with the hand and a large torque can be imported to the pipe.

Preferably, the first jaw is angled so that a v-shape is formed with the second jaw when the jaws are open. The v shape allows for easy fitting to the pipe, but provides stronger grip when the jaws close and become more parallel.

A specific embodiment of the inversion will now be described with reference to the accompanying drawings, which is not limiting on the invention.

Fig. 1 is a perspective view of an embodiment of the present invention.

Fig. 2 is a plan view of a prior art pair of pliers.

Fig. 3 is a cross-sectional view of an embodiment of the present invention.

Fig. 4 is a cross-sectional view of an embodiment of the present invention during use.

The gripping tool 10 comprises an elongated handle 12. At the end of the handle 12 is a first jaw 14 that has a face 14a pointing outwards, away from the handle 12. The face of the first jaw 14a is close to being perpendicular to the axis of the handle 12, but is slightly angled from the perpendicular. An 'L' shaped arm 18 has a second jaw 16 forming at one end. The second jaw 16 is arranged so that its face 16a is on the inner side of the 'L' shaped arm.

The arm 18 is positioned so that the end opposite the second jaw 16 is parallel with the axis of the handle 12, and the first jaw 14 and second jaw 16 are substantially facing each other.

A collar 20 holds the arm 18 and handle 12 together. The arm 18 passes through a first hole 21a through the collar 20 and the handle 12 passes through a second hole 21b parallel with the first hole 21a.

The collar 20 is connected to the handle 12 by a pivot 24. The pivot 24 is positioned on the handle 12 near to the first jaw 14 but just behind it.

The arm 18 is able to slide in and out of the collar 20 through the first hole 21a in order to adjust the separation of the jaws 14, 16. A thread 18a is provided on the side of the arm 18 close to and furthest away from the handle 12.

Whilst the other two sides are substantially smooth to allow the arm 18 to slide through the first hole 21a.

A threaded nut 22 is provided in a third hole 21c of the collar 20 in such a way that the arm 18 passes through the threaded nut 22 and the threaded nut 22 engages with the thread 18a of the arm 18. The threaded nut is retained in the collar 20 due to its size. Parts of the threaded nut 22 protrude from the collar 20 preventing it from moving, and so locking the position of the arm 18, and setting the separation of the jaws 14, 16 by turning the threaded nut 22. The arm 18 slides through the collar 20 and the second jaw 16 moves towards or away from the first jaw 14. The nut 22 may have a knurled finish to aid grip.

The collar 120 is pivoted to the handle 18 so that it may rock back and forth. This causes the second jaw 16 to close on the first jaw 14. The arm 18 will hit the edge of the handle 12 or first jaw 14 if the arm 18 is rocked too far, which prevents the jaws 14, 16 closing completely.

A leaf spring 26 is attached to the handle 12 and pushes on the underside of the collar 20 to bias the jaws 14, 16 together.

A second leaf spring 28 is attached to the outer side of the handle 12 and pushes on the collar 20 to bias the jaws 14, 16 open if they are near to the fully closed state.

The faces of the jaws 14a, 16a are arranged with small teeth to grip a pipe 30. The teeth on the first jaw 14 face away from the arm 18, and the teeth on the second jaw 16 face towards the arm. This arrangement ensures that a good grip can be formed.

In use, the user would press on the tow end of the arm 18 to open up the jaws 14, 16. He would then fit the jaws 14, 16 around the pipe 30 to be gripped. By releasing the arm 18, the leaf spring 26 biases the arm 18 to close the second jaw 16 onto the first jaw 14 and so grip the pipe 30.

By pushing on the handle 12 in a direction away from the arm 18, the teeth on the faces of the jaws 14a, 16a bite into the pipe 30 and grip. The arm 18 rolls about the pivot 24 to cause the jaws 14, 16 to close even tighter, and increasing the grip.

This action can be done with a single hand, and so greatly facilitates gripping the pipe, especially if the other hand is needed to use a spanner.

When pressure is released from the handle 12, the second leaf spring 28 pushes on the collar 20 and biases the jaws 14, 16 slightly open, so that it can be easily removed from the pipe 30.

The tool 10 can be used to fit to any size pipe by adjusting the separation of the jaws 14, 16, by turning the threaded nut 22. Of course, the skilled person would recognise that variations of this embodiment are possible without departing from the scope of the claims.

For example, the separation of the jaws 14, 16 may not be adjustable. Instead, the second jaw 16 may be directly pivoted to the handle 12 behind the first jaw 14. In this case, different sized tools 10 must be carried for different sized pipes 30.

Further, the first jaw 14, may not be rigidly attached to the handle 12, but may be pivoted to allow a slight rocking motion of the first jaw 14 to aid grip.

Of course, other mechanisms exist for adjusting the separation of the jaws 14, 16. For example the handle 12 could have a plurality of holes and the pivot 24 could be removable to select different holes at different distances from the first jaw 14, and various variations on this theme.

CLAIMS:

1. A gripping tool comprising:

a handle;

a first jaw attached to one end of the handle, the face of the first jaw arranged to be substantially perpendicular to the axis of the handle and facing away from the handle; and

a second jaw, the face of the second jaw arranged to be substantially opposite the face of the first jaw,

wherein the second jaw is connected to an arm generally parallel with the axis of the handle, the arm pivotally connected to the handle at a position behind the first jaw.

2. A gripping tool according to claim 1 wherein the separation of the first jaw and the second jaw is adjustable.

- 3. A gripping tool according to claim 2 further comprising a collar pivotally connected to the hand at a position behind first jaw, wherein the arm arranged to slideably engage with the collar in a direction substantially parallel with the axis of the handle, and having means to lock the arms to the collar.
- 4. A gripping tool according to claim 3, wherein the arm has a screw thread, and a threaded nut locks the arm to the collar.
- 5. A gripping tool according to any preceding claim wherever the first jaw is arranged to abut the arm to limit the extent that the second jaw and first jaw come together.
- 6. A gripping tool according to any preceding claim, wherein the inner jaw and outer jaw are urged together by a first spring.
- 7. A gripping tool according to claim 6, wherein the first spring in a leaf spring.
- 8. A gripping tool according to any preceding claim wherein the faces of the jaws are roughened to improve grip.
- 9. A gripping tool according to claim 8 wherein the roughening comprises teeth.
- 10. A gripping tool according to any preceding claim, wherein the first jaw and second jaw are made from plastic or metal.
- 11. A gripping tool according to any preceding claim, wherein a second spring is arranged to urge the first jaw and second jaw apart when fully closed.
- 12. A gripping tool according to claim 11, wherein the second spring is a leaf spring.
- 13. A gripping tool according to any preceding claim, wherein the handle is elongate.
- 14. A gripping tool according to any preceding claim in which the face of the inner jaw is angled slightly away from being perpendicular to the axis of the handle so that the separation of the jaws is widest and at a position away from the arm.
- 15. A gripping device according to any preceding claim arranged for gripping gas on water pipes.
- 16. A gripping device substantially as herein described with reference to the accompanying drawings.

ABSTRACT

A Gripping Tool

A gripping tool 12 for gripping a pipe 30 having a first jaw 14 and a second jaw 16 and a handle 12. The first jaw 14 is connected to one side of the handle 18 and the second jaw 16 is pivotally connected to the handle 18 behind the first jaw 14 so that the second jaw 16 can rock about the pivot 24 to close in on the first jaw 14, and so form a gripping action that can be actioned with one hand.



3 pages of drawings follow





