(12) UK Patent Application (19) GB (11) 2 050 484 A

(21) Application No **8018163**
(22) Date of filing **3 Jun 1980**
(30) Priority data
(31) **7905038**
(32) **11 Jun 1979**
(33) **Sweden (SE)**
(43) Application published
7 Jan 1981
(51) **INT CL**[3]
F16B 2/10
(52) Domestic classification
E2A 300 306 414 GD
(56) Documents cited
None
(58) Field of search
E2A
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(54) **Clamping Device**

(57) The invention relates to a clamping device for releasably connecting objects to each other, e.g. a signboard to a pole, comprising a yoke (13) pressed against a holder (11) by means of a conical screw (15) which by a thread (37) engaging the edge of an aperture (29) in the holder, is displaceable transversely of the yoke; a deformable end portion of said yoke being laid in a loop (33) around the screw (15) to be pulled as the screw is moved in.

FIG 1

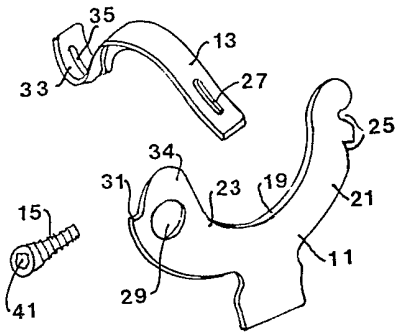

FIG 2

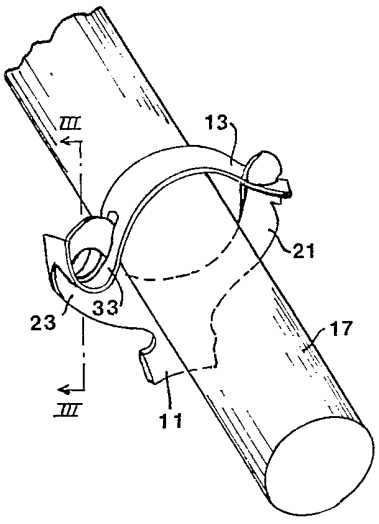

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FIG 1

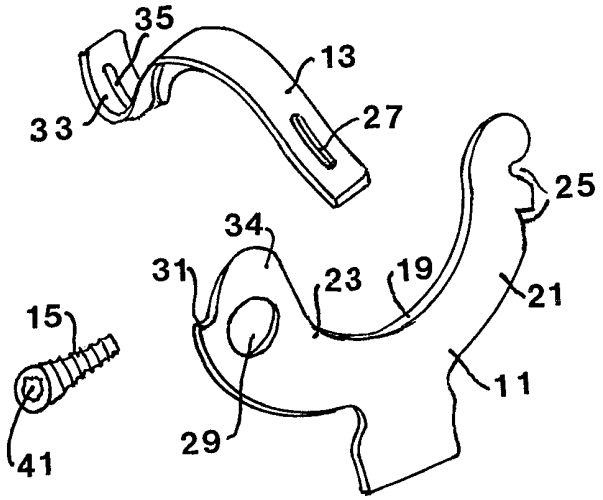


FIG 2

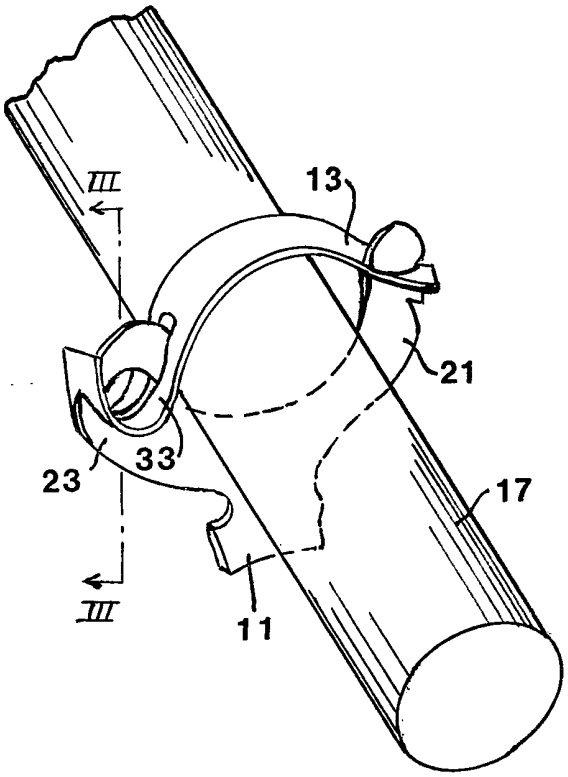


FIG 3

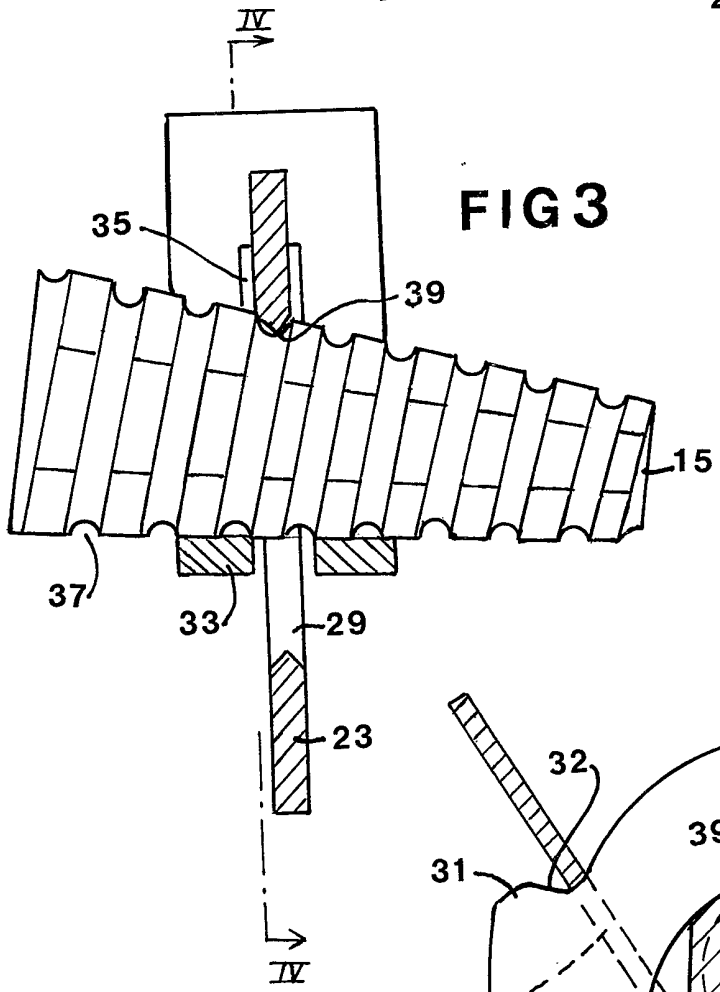


FIG 4

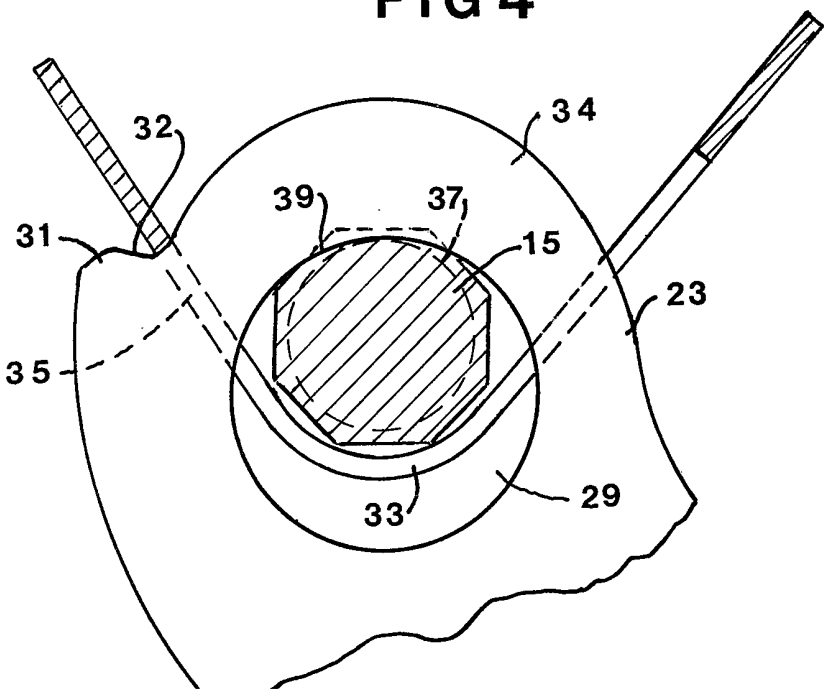


FIG5

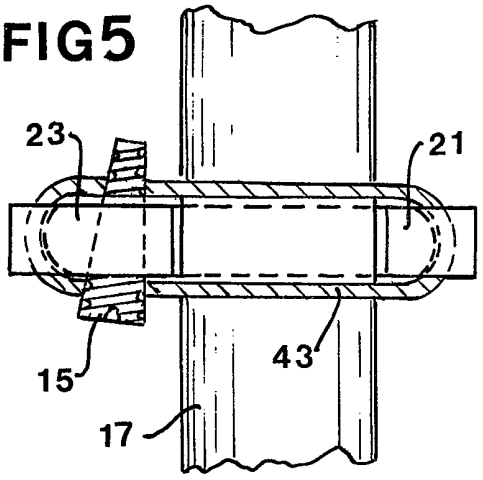


FIG 6

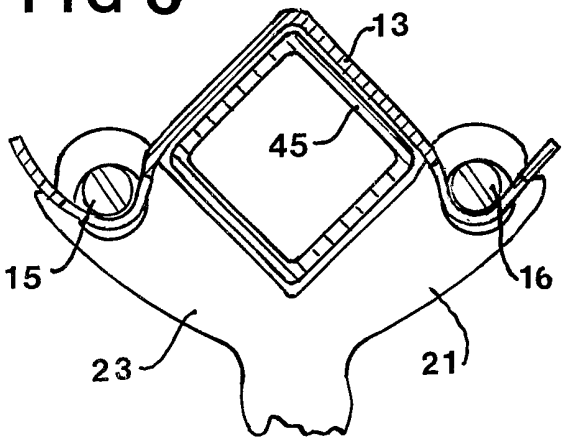


FIG 7

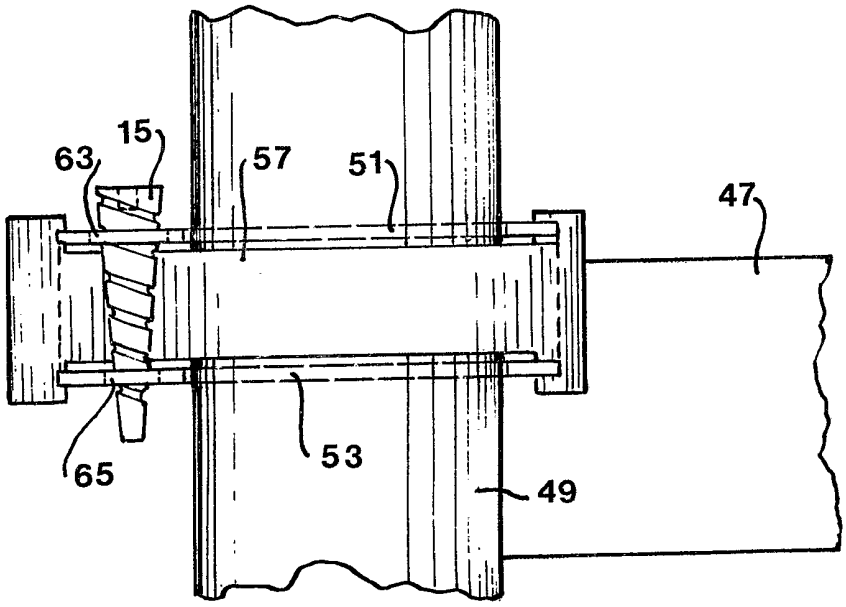
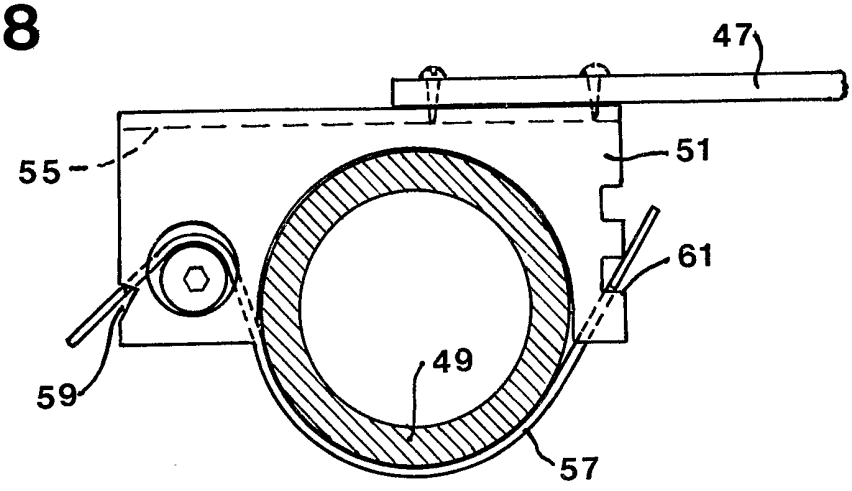


FIG 8



SPECIFICATION

Clamping Device Including a Yoke and a Conical Screw for Tightening

The invention relates to a clasping or clamping device including a holder and a yoke meant to be applied from opposite sides against and around an object of some kind, e.g. a rod, so as to be releasably attached thereto.

In a known design of a similar clasping or clamping device one end of the yoke is pivotted to the holder, and the other end of the yoke is pressed towards the holder by means of a detachable nut-and-bolt unit. In another known design the end of the yoke is shaped as a threaded bolt extending through a bore in the holder and is securable to be tightened by a nut.

Such known devices are cumbersome to assemble and disassemble, the nuts as a rule having to be turned many more revolutions than are required merely for the forceful application of the yoke or for the loosening of its grip. When used outdoors the nuts are apt to stick due to rust and they are also delicate to handle and difficult to be correctly threaded on.

An object of the invention is to provide a clasping or clamping device wherein these drawbacks are avoided or minimized, and which is easy to apply and to remove and also comprises a minimum of details.

In principle the invention resides in that both ends of the yoke are connected to the holder with a fixed distance between them and that the yoke is deformed near one end thereof by a conical screw movable across the same producing a growing bend thereof, whereby the rest of the yoke is stretched.

Thus, according to the present invention there is provided a clamping device comprising a holder member and a yoke member or like retaining means movable relative thereto for releasably embracing an object, characterised in that at least one end portion of the yoke is extendible around a conical screw such that the face of the yoke remote from the main body of the holder makes contact with part of the periphery of said screw; said screw such as to extend across the yoke and have a helical thread engageable with the edge of one or more apertures in said holder, whereby said end portion of the yoke is displaced when the screw is advanced by being turned.

Specific further features of the invention are defined in the following sub claims.

The invention will be described further, by way of example, with reference to the accompanying drawings, in which:—

Figs. 1 to 4 illustrate a clasping or clamping device forming a first embodiment of the invention, wherein Figs. 1 and 2 are perspective views of the device disassembled and partly assembled, respectively, and Fig. 3 is an enlarged cross-section taken along the line III—III in Fig. 2, whilst Fig. 4 is an enlarged cross-section at right angles thereto taken along the line IV—IV in Fig. 3;

Figs. 5 and 6 respectively illustrate second and third embodiments of the invention; and

Figs. 7 and 8 are side and plan views, respectively of a fourth embodiment of the invention.

A gripping or clamping device is shown in Figs. 1 to 4 comprising three elements, namely a holder (support or base member) 11, a yoke (hasp or strap) 13 and a conical screw 15. The clamping device is intended to embrace and be tightened around any suitable stationary object, which is exemplified in Fig. 2 by a rod 17. To the holder 11 there may be attached any appliance or device (not shown) that is desired to be carried by or connected to the rod 17 in a detachable manner.

The holder 11 comprises a plate, preferably of steel, which on opposite sides of an inwardly curved approximately half-circular edge 19 has two projecting arms or branches 21, 23. The edge of the plate is of such a contour as to fit over nearly half of the circumference of the rod 17. The outer edge of the branch 21 has notches 25 and the yoke 13 is engageable therein once the end of the branch 21 has been passed through longitudinal slot 27 in yoke 13. A circular aperture 29 is provided in the opposite branch of the holder plate and a step 31 and an adjacent notch 32 are provided close to the aperture 29 and in the outer edge of the branch 23.

The yoke 13 comprises a flexible but hardly stretchable strip, e.g. of thin sheet steel, the middle section of which is arched so as to approximately fit with its broad face against the cylindrical circumference of the rod 17 opposite to the edge 19 of the holder 11. When the slot 27 has been hooked into that one of the notches 25 which is best adapted to the size of the rod, one end of the yoke 13 is thus pivotally connected to the holder branch 21 and can be swung down over the rod 17 to embrace the same. At its other end, the tightening end, the yoke 13 is curved outwardly, i.e. oppositely to its middle section, to thus form a bend 33 having a central approximately part-cylindrical portion which merges on both sides into substantially straight portions usually forming an angle of 90 to 150 degrees to each other. Along the centre line of said bend there extends a slot 35 of a sufficient length to allow a tongue-shaped end 34 of the branch 23 and the greater part of the aperture 29, to pass therethrough (see Fig. 2) until the outer end of the slot 35 is engaged by the step 31 and retained in the notch 32.

For tightening of the yoke the screw 15 is inserted into the aperture 29. The screw is substantially conical and in its tapering face there is cut a helical groove 37 forming a thread of such a contour as to make possible a forcible and secure engagement with bevelled edge 39 of the aperture 29. A typical screw has a length of 60 mm, a maximum diameter of 30 mm and a minimum diameter of 10 mm, but of course, said measures and relations are not critical. In its big end the screw has a hexagonal recess 41 for a correspondingly shaped key, or alternatively, has

a diametrically extending groove for a screw driver or a hexagonal head for turning by a wrench. To begin with, the screw can usually be passed partly into the aperture 29 without being turned. When contact is made with the edge 39 as well as with the yoke bend 33, turning of the screw is required for further axial displacement of the screw. During this turning motion the bend is gradually displaced (downwardly in Figs. 3 and 4) and widened, so that the outwardly concave portion of the yoke grows, i.e. its end depression is deepened. The ends of the yoke being hooked up on the notches 25, 32 in the holder branches at a fixed mutual distance and the yoke not being extensible, the above-described contracting depression at one end of the yoke will cause a corresponding straightening of the yoke in other places, which means that the yoke is being stretched and applied with an increasing force against the rod 17. The contact of the screw with the yoke bend on opposite sides of the aperture 29 has a balancing and stabilizing effect upon the screw, whereby its axial motion is guided in a direction nearly parallel to the transverse direction of the yoke or the axial direction of the rod 17. The stretching of the yoke around the rod 17 corresponds to the increased length of the bend 33 and the adjoining straight portions, and said length grows faster than the growth of the diameter of the screw at the thread engagement point. This is because not only the curved portion of the bend 33 but also the two adjoining straight portions grow in length at the same time. The yoke slides against the screw but is slightly entrained thereby.

When the screw has been turned enough to give the desired pressure of the yoke against the rod, the screw is self-locking due to the friction and the low pitch of the helical thread; this is true also when the screw is fully circular in all cross-sections. However, in order to safely prevent unwinding, e.g. due to vibration, it is preferable to make the screw of angled or cornered section, e.g. octagonal, as shown in Figs. 3 and 4. As an alternative thereto, the screw may be shaped with longitudinal furrows and ridges, so that the mainly conical face is dotted with knurls or teeth.

The term "yoke" used in this description and in the claims is meant to comprise hasps, straps and/or other preferably elongate retaining members, which all have the quality of being bendable, at least in parts.

Fig. 5 shows a modified embodiment, in which the yoke 13 of Figs. 1 to 4 is replaced by an endless wire loop 43, which is laid into notches in the branches 21, 23 of the holder, and the two parallel strands of which loop are both stretched by the screw 15 acting against a bight thereof. In this case the wire may encircle more than half the circumference of the rod 17 and the branches 21, 23 be correspondingly shortened.

Fig. 6 shows a further embodiment of the clasping or clamping device suitable for embracing a cornered object, which in the example is a square-sectioned tube 45. As the yoke is not easily moved past the protruding corner, it is instead stretched in opposite directions from the middle by two conical screws 15, 16 in a symmetrical arrangement.

In the embodiment shown in Figs. 7 and 8, where the clasping or clamping device is used for attaching a signboard 47 to a tubular post 49, the holder is doubled in comparison to the above-described design thereof. The holder comprises two similar, parallel plates 51, 53 held spaced apart by a vertical plate 55 integral therewith. The yoke or stretching strap 57 extends between said plates and has its ends secured to opposite edges of the plates by means of lateral projections interlocking with corresponding recesses or notches 59, 61 in the two plates. The screw 15, which has a uniform pitch, extends through and is guided by apertures 63, 65 situated approximately opposite each other, but, in preferred manner, somewhat offset so that the screw gets enough inclination to have it make contact with the curved face of the strap 57 along a line approximately perpendicular to the plates 51, 53.

Of course, the above-described embodiments may be modified in several respects without departing from the scope of the invention as set forth by the following claims. For instance, one end of the yoke or strap may be permanently connected to the holder, such as by means of a hinge or by forming the yoke as an integral part of the holder.

The clasping or clamping device according to the invention has the advantage of easy assemblage and dissemblage. Due to the engagement of the screw thread being concentrated to part only of one thread, there is no or only minimal risk of a corrosive fixation, and after turning the screw merely a few revolutions the grip is loosened enough to make the screw free of the edge of the aperture, and it can then be withdrawn without further turning, as contrasted to the condition when a rusted nut should be turned loose and out of a bolt thread.

Claims

1. A clamping device comprising a holder member and a yoke member or like retaining means movable relative thereto for releasably embracing an object, characterised in that at least one end portion of the yoke is extendable around a conical screw such that the face of the yoke remote from the main body of the holder makes contact with part of the periphery of said screw; said screw such as to extend across the yoke and have a helical thread engageable with the edge of one or more apertures in said holder, whereby said end portion of the yoke is displaced when the screw is advanced by being turned.

2. A device as claimed in claim 1, in which the ends of said yoke are held at a fixed mutual distance by being connected to the holder by means of interlocking projections and recesses.

3. A device as claimed in claim 1 or 2, in which, in use, the yoke is pressed against the

object to be embraced by a straightening stretching of one portion thereof corresponding to a contractive bending of an end portion of the yoke by the action of the screw.

4. A device as claimed in claim 1 or 2, in which the holder includes a tongue or similar projection which is extendible through a slot in the end portion of the yoke, and in which the conical screw is insertable into an aperture in said tongue. the thread of said screw engageable with the edge of said aperture and the periphery of the screw abuts against the curved portion of the yoke on opposite sides of said slot and thereby being guided for longitudinal displacement.

5. A device as claimed in claim 4, in which the outermost end of said slot is capable of being hooked upon said tongue and retained by a step or a notch in the edge thereof.

6. A device as claimed in claim 1, 2 or 3, in which the yoke is adapted to extend between two parallel plates forming part of the holder, and in which the screw is insertable through opposed apertures in said plates and is such as to contact the yoke on one side and the edges of said apertures of the plates on the other side.

7. A device as claimed in claim 6, in which the relative position of the apertures is such that, in a position of use, the axis of the screw is held inclined and its side face in contact with the yoke is held perpendicular to said plates.

8. A device as claimed in claim 1, in which the contour of the cross-section of the conical screw is angular or toothed.

9. A clasping or clamping device substantially as herein described with reference to and as illustrated in Figs. 1 to 4, Fig. 5, Fig. 6 or Figs. 7 and 8 of the accompanying drawings.

Printed for Her Majesty's Stationery Office by the Courier Press, Leamington Spa, 1981. Published by the Patent Office, 25 Southampton Buildings, London, WC2A 1AY, from which copies may be obtained.