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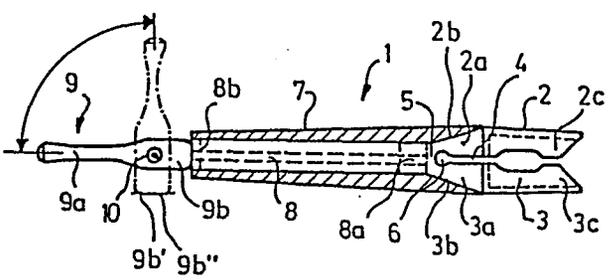
(54) Clamping device.

(57) A clamping device, for example a clothes peg, consisting of two shanks (2, 3) which are connected to each other (5) and are mutually sprung with the spring bias acting in opposite directions, and a locking organ (7) so arranged as to be capable of being displaced along the shanks in order to adopt one of two positions, being a first position in which the shanks adopt an open or divergent position, and a second position (Fig. 1) in which the shanks adopt a closed or convergent position. The locking organ (7) is so arranged as to adopt the first position (Fig. 1) via the spring bias exerted by the shanks (2, 3) on the locking organ (7).



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TITLE OF THE INVENTION: Clamping device.

TECHNICAL FIELD.

The present invention relates to a clamping device and in particular to such a clamping device as consists of two shanks which are connected to each other and are mutually sprung with the spring bias acting in opposite directions, and a locking device so arranged as to be capable of being displaced along the shanks in order to adopt one of two positions, being a first position in which the shanks adopt an open or divergent position, and a second position in which the shanks move towards each other in a closed or convergent position, with the locking device being so arranged as to be capable of being extended and displaced along a rod, one end of which supports the shanks.

Although a clamping device of the present kind may be used in a range of different applications, particular mention should be made of the fact that the clamping device can be specially adapted to serve as a clothes peg and to hold clothes which have been washed on a clothes line or washing line.

DESCRIPTION OF THE PRIOR ART.

Previously disclosed is the design of clamping devices, in particular clothes pegs, in which two shanks are so arranged as to interact with each other via a spring. The shanks act as a

two-armed lever about the attachment for the spring and are forced towards each other by the spring. When one of the ends of the shanks are caused to move towards each other, the other ends will open against the spring bias.

Previously disclosed is the manufacture of these clothes pegs in wood or plastic.

Also previously disclosed via Swedish Patent Specification 133 689 is the manufacture of a clothes peg in metal with two mutually sprung and connected shanks, the ends of which are bent inwards between the shanks to form a sprung clamping device. The clothes peg is so executed for this purpose as to exhibit fastenings directly opposite each other intended to grip the clothes and the washing line. The ends of the parts which are bent inwards between the shanks must be supported against the insides of the shanks so as to form sprung and sliding gripping components for the clothes and the washing line. Also described is a locking ring enclosing the shanks of the clothes peg, said locking ring being so arranged as to be capable of being displaced along the clothes peg and so arranged as to engage in one of a number of locking grooves formed on the shanks of the clothes peg intended to lock the shanks securely in the desired position on the washing line.

As further examples of the prior art, reference may be made to the following devices which are proposed and specificed in

West German Patent Specification 343 584
French Patent Specification 907 620
American Patent Specification 1 194 509
American Patent Specification 3 214 810
American Patent Specification 3 924 303.

DESCRIPTION OF THE PRESENT INVENTION.

TECHNICAL PROBLEM.

It has been found that clamping devices, in particular clothes pegs, of the previously disclosed nature consisting of two shanks with interjacent springs, said shanks acting about the spring as a two-armed lever, exhibit the disadvantage that the shanks twist in relation to each other under uneven load and become detached from the spring attachment.

A clothes peg of the nature described in Swedish Patent Specification 133 689 basically suffers from the disadvantage that it requires the clothes peg to be made of metal, besides which the locking ring is difficult to move from one locking groove to another, and it is particularly difficult to achieve this movement using only one hand.

Technical problems of a major kind have been encountered in conjunction with the design of a clamping device having on the one hand a small number of constituent parts and being executed on the other hand in such a way that the constituent parts can easily be caused to interact with each other during assembly. It would be particularly advantageous if all the parts could be manufactured in a simple fashion by a plastic injection process.

It is also known to be a fact that clamping devices, for example clothes pegs, of the previously disclosed nature are not found easy to use by the disabled. This is particularly true in the sense that causing the clamping device to move into the open position normally calls for the application of a considerable amount of force, usually equivalent to or somewhat in excess of the tension of the spring.

A major technical problem is thus encountered in conjunction with the design of a clamping device of such a kind that it can be used by the disabled without the need to use a great deal of force. There exists a pronounced wish for the clamping device to be capable of being operated with the help of the mouth.

A further major technical problem is associated with the design of a clamping device such that it may, in a simple, effective and space-saving fashion, be packaged in such a way that the pack containing a number of clamping devices will possess a rectangular configuration.

An additional major technical problem is encountered in connection with clamping devices of the aforementioned nature, in creating conditions such that the constituent parts can be executed and manufactured from a plastics material, with each part having been given a form such that the manufacture of the part can take place via the plastic injection process. The use of the plastic

injection process also requires the parts to have been given a form such as will create the necessary conditions to permit the very rapid cooling of the components following the plastic injection operation, thereby enabling productivity to be increased.

Finally, a major technical problem has been encountered in conjunction with the creation of conditions such that the clothes peg can be locked or blocked with the shanks in the closed position, so that items of clothing, suits and coats, etc., can be secured and hung up by the clothes peg via the hook of the coat hanger.

SOLUTION.

The present invention relates to a clamping device, for example a clothes peg, consisting of two shanks which are connected to each other and are mutually sprung with the spring bias acting in opposite directions, and a locking device so arranged as to be capable of being displaced along the shanks in order to adopt one of two positions, being a first position in which the shanks adopt an open or divergent position, and a second position in which the shanks adopt a closed or convergent position, with the locking device being so arranged as to be capable of being extended and displaced along a rod, one end of which supports the shanks.

The invention relates to the novel feature that there is present at the second end of the rod an operating organ which is so arranged as to force the locking device into the second position against the spring bias of the shanks in a previously disclosed fashion, and that the operating organ exhibits means for locking the locking organ in that position.

The shanks are executed each with its own sloping surface which match the corresponding sloping surfaces of the locking device, said sloping surfaces being so dimensioned as to be capable of causing the locking device to be displaced by the spring bias of the shanks towards the first position. The operating organ is so arranged as to be capable of forcing the locking organ to be displaced towards the second position, thereby causing the shanks to move gradually towards each other.

The operating organ is so attached via a shaft to the other end of the rod as to be free to rotate.

Particularly appropriate to the present invention is the manufacture of the shanks and the rod, the locking organ and the operating organ from a palstics material, with the preferred plastics material used being polypropylene.

By causing the shanks to be executed with grooves and by causing the rod to be given an I-shaped cross-section a design will be produced which can be cooled rapidly in a tool suitable for plastic injection.

By causing the shanks, the locking organ and also the operating organ to be given an essentially wedge-shaped form such conditions will be created as will permit the simple and space-saving packing of a number of clamping devices in a rectangular pack (container or box), so that two clamping devices placed side by side will form a parallelepipedic shape, when the operating organs will adopt a position in which the locking organs will be in their second position and the two clamping devices are positioned in such a way that the respective operating organs each faces in its own particular direction.

ADVANTAGES

The advantages which may be regarded as being principally associated with a clamping device in accordance with the present invention are essentially that the constituent parts can be produced in a simple fashion from a plastics material, that the operation of the clamping device via the operating organ is easy for the disabled and does not call for the use of a great deal of force, and that the clamping device has been so designed as to permit the simple packing of a number of clamping devices into a rectangular pack.

What may be regarded as the principal characteristic features of a clamping device in accordance with the present invention are contained in the characterizing part of Patent Claim 1 below.

BRIEF DESCRIPTION OF THE ACCOMPANYING DRAWING.

A preferred embodiment of a clamping device exhibiting the significant characteristics associated with the present invention is described below in greater detail with reference to the accompanying drawing, in which:

Figure 1 shows a side view and a partially sectioned view of a clampign device in which an operating organ has adopted a second position;

Figure 2 shows the shanks of the clamping device in accordance with Figure 1 in front view;

Figure 3 shows a sectional view of a locking organ belonging to the clamping device in accordance with Figure 1;

Figure 4 shows a different side view and a partially sectioned view of the clamping device in accordance with Figure 1;

Figure 5 shows a clamping device in accordance with Figure 1 in which the locking organ has adopted a first position via an operating organ which has adopted its first position;

Figure 6 shows a second embodiment in plan view and in an exploded view; and

Figure 7 shows an embodiment in which the operating organ consists of two component parts which are able to interact with each other.

DESCRIPTION OF THE PREFERRED EMBODIMENT.

With reference to Figure 1 is shown in side view and in partially sectioned view a clamping device, preferably a clothes peg, 1 consisting of two shanks 2, 3 which are connected to each other and are mutually sprung with the spring bias acting in opposite directions. This is achieved by causing the parts 2a and 3a of the shanks to be separated via a slot 4 and to be connected to each other as indicated by the reference designation 5 via a groove 6 .

A locking organ 7 is so arranged as to be capable of being displaced, amongst other things, along the shanks 2, 3 and in

particular the parts 2a and 3a of the shanks in order to adopt one of two positions. A first position is shown in Figure 5, where the shanks 2, 3 adopt an open or divergent position, and a second position is shown in Figure 1, where the shanks adopt a closed or convergent position by being moved closer together. It is proposed in conjunction with the manufacture of the shanks 2, 3 that these should be executed for this purpose with an opening somewhat larger than that shown in Figure 5.

The locking organ 7 is so arranged as to be caused to adopt the position shown in Figure 5 by the spring bias which the shanks 2, 3 exert on the locking organ. The locking organ 7 is so arranged as to be capable of being extended and displaced along a rod 8 , one end of which 8a supports the shanks 2, 3 . At the other end 8b of the rod is present an operating organ 9 , said operating organ being so arranged as to be capable of forcing the locking organ 7 to be displaced against the spring bias of the shanks 2, 3 into the second position, as shown in Figure 1, and of locking the locking device 7 and the shanks 2, 3 in that position. The shanks 2, 3 are executed each with its own sloping surface 2b, 3b which match corresponding sloping surfaces in the locking device 7 and which have been given the reference designations 7a and 7b in Figure 3. These sloping surfaces are so dimensioned as to be capable of causing the locking device 7 to be displaced by the spring bias of the shanks 2 and 3 towards the first position shown in Figure 5, although in addition the locking device 7 will be forced to be displaced towards the second position, as shown in Figure 1, as the free ends 2c, 3c of the shanks 2, 3 gradually move towards each other.

The operating organ 9 is so attached via a pivot shaft 10 to the other end 8b of the rod 8 as to be free to rotate. The operating organ 9 exhibits an operating rod 9a situated to one side of the pivot shaft 10 , and a heel 9b designed to actuate the locking organ 7 situated to the other side of the pivot shaft 10 . The heel 9b is so executed as to exhibit chamfering or rounding 9b enabling it to slide into good contact with the end surface 7c of the locking organ 7 .

In accordance with the present invention it is also proposed that the shanks 2, 3 and the rod 8 and the locking organ 7 and the operating organ 9 shall be capable of being manufactured from a plastics material. Polypropylene is proposed as a suitable plastics material.

It is clear from Figure 2 that the shanks 2, 3 and their free ends 2c, 3c are executed with a number of parallel grooves 2d, 3d . It is clear from Figure 3 that the rod 8 is given an I-shaped cross-section. In this way such conditions are created as to provide a design which will permit rapid cooling in a tool suitable for plastic injection.

It is also clear from Figure 1 that the shanks 2, 3 , the locking organ 7 and also the operating organ 9 are given an essentially wedge-shaped design, which offers advantages in conjunction with the packing of the clamping device, since two clamping devices situated side by side will then form a rectangular shape when they are placed next to each other so that each of the respective operating organs 9 will face in its own particular direction.

If the clamping device is assumed to adopt the position shown in Figure 5 as a result of the organ 9 having adopted its first position and as a result of the shanks 2, 3 being able to force back the sleeve 7 against the operating organ 9 , it will then be possible to place the open shanks 2' and 3' over a washing line holding items of washing. By then causing the operating organ 9 to turn in the direction of the arrow into a position as shown by solid lines in Figure 1 , said position constituting the second position, the advantage will be provided that the shanks 2 and 3 are caused to interact with each other by moving into the position shown in Figure 1. Any variations in the thickness of the material which is to be held in place can be absorbed by the elastic deformation of the part 7d of the sleeve 7 and to a certain extent also by the shanks 2, 3 themselves.

It has been found practical to select a value within the range $1.5 - 5^{o}$ for the angle 'a' , being preferably about 2.5^{o}, and it has also been found appropriate to select a value within the range

15 — 30° for the angle 'b' , being preferably about 20°, in this way producing a clamping device possessing an effective function.

It can be mentioned in conjunction with the part 9b of the operating organ 9 that, apart from the rounding 9b', the part 9b should be so executed as to exhibit a flat surface 9b" intended to make contact with the surface 7c .

It may also be mentioned that the direction of displacement 's' indicated in Figure 5 in respect of the displacement of the locking organ 7 along the shanks 2, 3 can, of course, be varied depending on the value selected for the angle 'b' and the value of the distance selected between the pivot shaft 10 and the flat surface 9b" .

It may also be mentioned that the locking organ can be manufactured with a material thickness of 0.8 — 1.0 mm, which may also be regarded as being applicable to the rod 8 .

When the clamping device adopts the position shown in Figure 1 the device will be locked in position by the organ 9 .

Finally, the operating rod 9a may be provided with a hole 9a' intended to be capable of interacting with a hook or similar.

A second embodiment is shown with reference to Figures 6 and 7. This, too, exhibits two shanks 2, 3 separated by a slot 4 . A locking organ 7 with a continuously tapering cross-section is capable of being displaced towards, and is capable of being displaced by the tension of the shanks 2, 3 away from the flat surface 2b, 3b of the shanks 2, 3 . These surfaces exhibit recesses 2b', 3b' for the purpose of increasing the size of the opening between the shanks 2, 3 when the locking organ 7 is in its released position.

The operating organ 9 consists in this instance of two components 9d and 9e which interact with each other, said component 9d exhibiting a hook 9f and two pins 9g and a third pin 9h . The pins 9g shall interact with holes 9k in the component 9e , which exhibits a pin 9h' .

The pins 9h and 9h' are intended to form a pivot shaft for the organ 9 and shall interact with a hole 11 in the rod 8.

It is also proposed that the various components may with advantage be manufactured in acetal resin, for instance Delrin 500.

The invention is not, of course, restricted to the embodiment described above by way of example, but may undergo modifications within the context of the following Patent Claims.

PATENT CLAIMS.

1. Clamping device, for example a clothes peg, consisting of two shanks (2, 3) which are connected to each other (5) and are mutually sprung with the spring bias acting in opposite directions, and a locking device (7) so arranged as to be capable of being displaced along the shanks in order to adopt one of two positions, being a first position in which the shanks adopt an open or divergent position, and a second position (Figure 1) in which the shanks move towards each other in a closed or convergent position, with the locking device (7) being so arranged as to be capable of being extended and displaced along a rod (8), one end of which supports the shanks (2, 3), c h a r a c t e r i z e d in that at the other end (8b) of the rod is present an operating organ (9) which is so arranged as to force the locking device (7) into the second position (Fig. 1) against the spring bias of the shanks (2, 3) in a previously disclosed fashion, and in that the operating organ (9) exhibits means of locking the locking device (7) in that position.

2. Clamping device in accordance with Patent Claim 1, c h a r a c t e r i z e d in that the shanks (2, 3) are executed each with its own sloping surface (2b, 3b) which match the corresponding sloping surfaces (7a, 7b) of the locking device (7), said sloping surfaces being so dimensioned as to be capable of causing the locking device (7) to be displaced by means of the spring bias towards the first position and, when the locking organ (1) is forced towards the second position, of causing the shanks (2c, 3c) to move gradually towards each other.

3. Clamping device in accordance with Patent Claim 3, c h a r a c t e r i z e d in that the operating organ (9) is so attached to the other end of the rod as to be free to rotate (10).

4. Clamping device in accordance with patent Claim 1, c h a r a c t e r i z e d in that the shanks and the rods (8),

the locking device (7) and the operating organ (9) are made of a plastics material, preferably polypropylene.

5. Clamping device in accordance with Patent Claim 4, c h a r a c t e r i z e d in that the shanks are so executed as to exhibit grooves (2d, 3d) and the rod (8) has been given an I-shaped cross-section in order to produce a design which will cool rapidly in a tool suitable for plastic injection.

6. Clamping device in accordance with Patent Claim 1, c h a r a c t e r i z e d in that the shanks, the locking organ and also the operating organ have been given an essentially wedge-shaped design.

7. Clamping arrangement in accordance with any of the preceeding Claims, c h a r a c t e r i z e d in that the operating organ consists of two component parts which are capable of interacting with each other and which, when in the interacting position, together form a pivot pin (9h, 9h').

8. Clamping arrangement in accordance with any of the preceeding Patent Claims, c h a r a c t e r i z e d in that the shanks (2, 3) exhibit a recess (2b', 3b') in order to increase the size of the opening between the shanks.

9. Clamping arrangement in accordance with any of the preceeding Patent Claims, c h a r a c t e r i z e d in that the locking organ (7) consists of a sleeve of continuously tapering section.

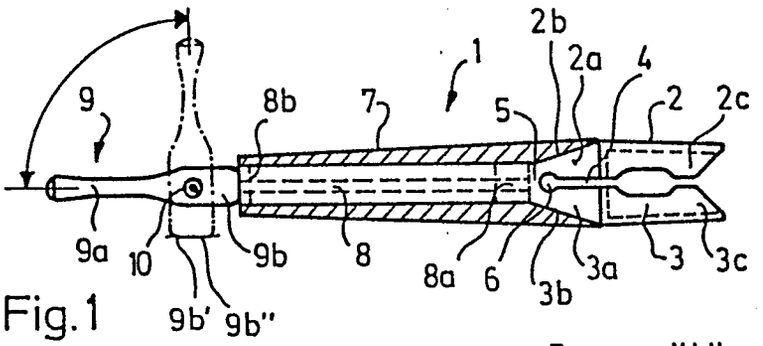


Fig.1

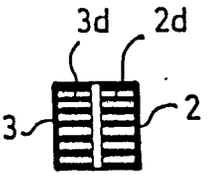


Fig. 2

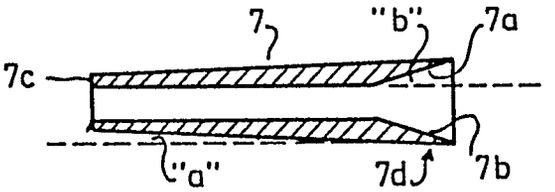


Fig. 3

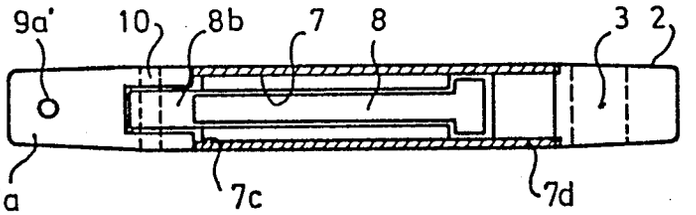


Fig. 4

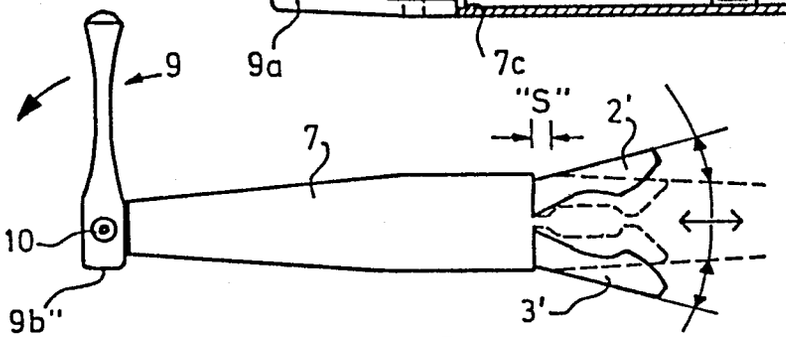


Fig. 5

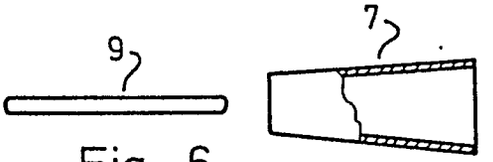
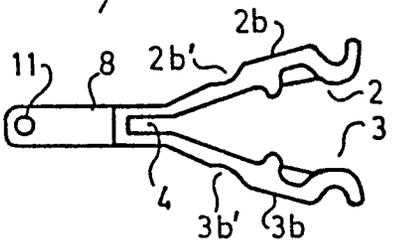


Fig. 6



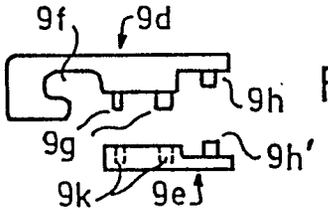


Fig. 7