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(54) **Pipe retaining clips**

(57) A pipe retaining clip 1 of plastic material has a base portion 2, adapted to be screwed to a supporting surface, and a pipe retaining portion comprising curved side walls 3 which define a C-shaped channel 4. The interior surface of the channel 3 is provided with a plurality of inwardly projecting longitudinal ridges 7 and, in use, the longitudinal ridges 7 engage a pipe 11 which has been snap-fitted into the channel 3.

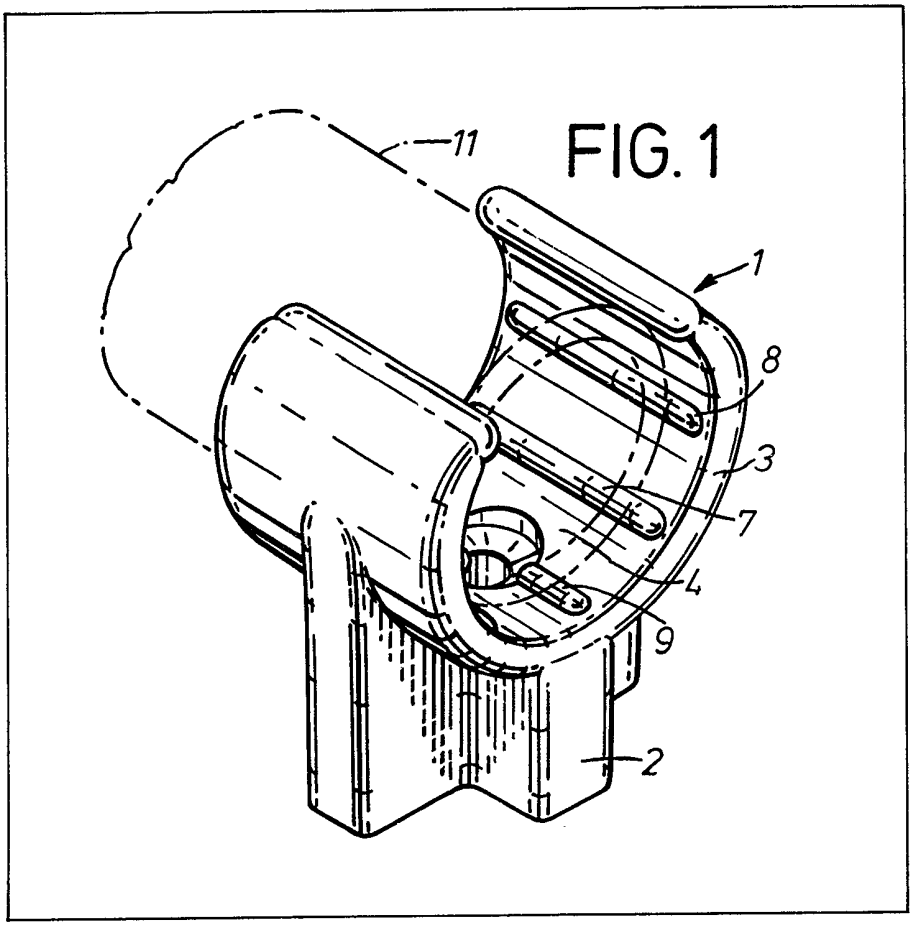

FIG. 1

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FIG. 1

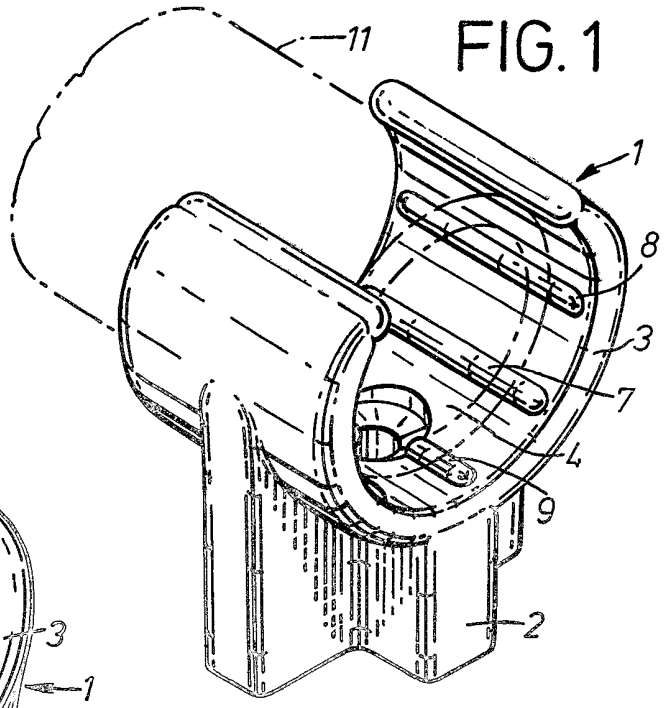
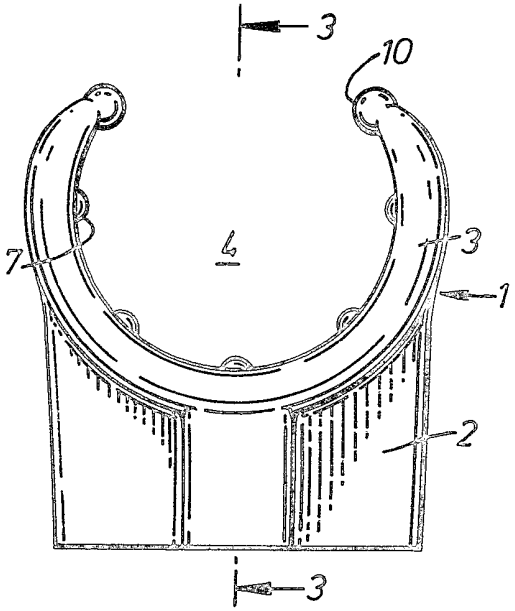


FIG. 2



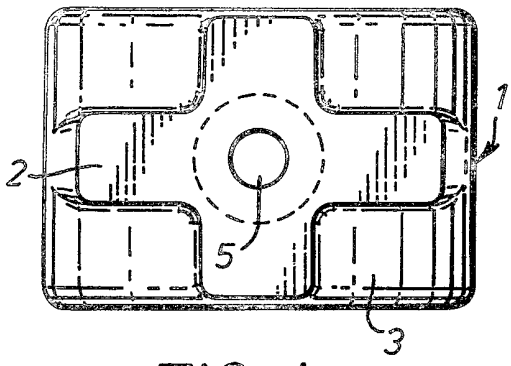


FIG. 4

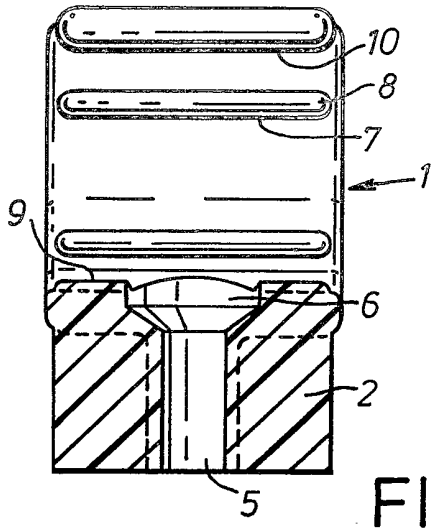


FIG. 3

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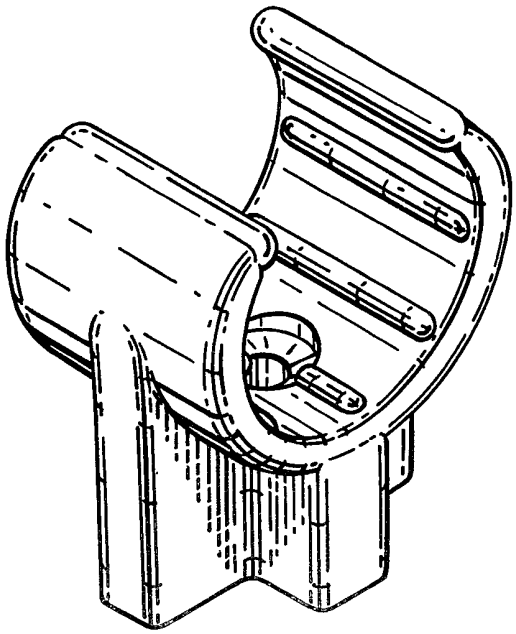
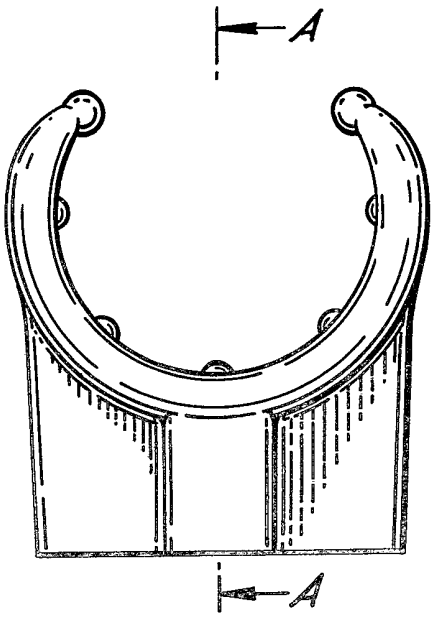
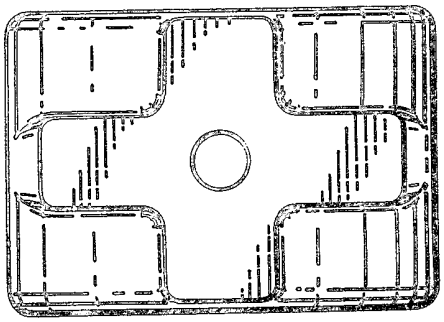
-Perspective view from above, one side & one end.-

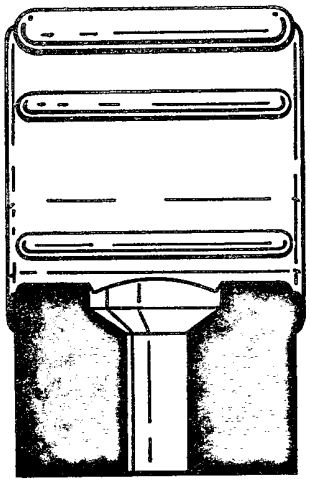




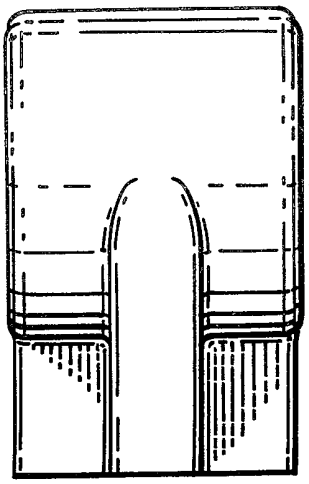
-Elevation of other end.-



-Underneath plan.-



-Section A-A.-



-Elevation of other side.-

SPECIFICATION

Pipe retaining clips

This invention relates to retaining clips for use in attaching pipes or other elongate members to a supporting surface and is particularly concerned with retaining clips for plastic pipes.

The use of plastic pipes has become widespread in both industrial and domestic plumbing systems since they are cheaper to manufacture, easier to work with, and do not corrode as readily as their metal counterparts. However, since the physical properties of plastic pipes differ from metal pipes, problems have been encountered in securing plastic pipes to supporting surfaces such as walls, floors or ceilings particularly in the case of, for example, hot water pipes where the temperature of the pipe may vary considerably.

Metal clips are known which may be attached to, for example, a wall by one or more screws which screws deform the clip around a pipe so as to tightly clamp the pipe and firmly secure it within the clip. Such clips have several disadvantages, particularly when used with plastic pipes which are inherently weaker than their metal counterparts and tend to deform or fracture owing to the high pressure exerted thereon by the clip. Furthermore, such metal clips do not accommodate any substantial longitudinal movement of the pipe through the clip once the pipe has been secured therein and experience has shown that this leads to the clips being pulled from, for example, the wall upon the occurence of thermal expansion or contraction of the pipe due to variations in the temperature of the fluid flowing therethrough. This problem is particularly significant in the case of plastic pipes which generally have a relatively high coefficient of expansion.

Recently, plastic pipe clips have been developed which are easier to mount and neater in appearance than metal clips and, like plastic pipes, they are free from corrosion. Generally such clips have a base portion adapted to be secured by screwing to, for example, a wall, and pipe retaining portion having curved resilient side walls which define a C-shaped channel with a substantially smooth inner surface. In use, the clip is screwed to a wall and a pipe is then snap-fitted into the channel. The channel is precisely dimensioned with respect to the pipe so that the resilient walls are deformed outwardly as the pipe is pushed into place and, when the pipe is disposed within the channel, the walls are displaced outwardly from their equilibrium positions and, owing to their elasticity, exert a constant force on the pipe. Thus, the pipe is primarily secured within the C-shaped channel by the elastic force exerted thereon by the curved resilient walls.

However, known pipe clips of this type have two important disadvantages in that, firstly, the clips readily heat up when the temperature of the pipe rises and this can lead to damage to the clips due to high temperature deterioration of the plastic and, secondly, experience has shown that the clips do not adequetely accommodate longitudinal movements of the pipe due to thermal expansion and are liable to be torn from the supporting surface.

According to the invention there is provided a retaining clip of plastic material for a pipe or other cylindrical elongate member, said clip comprising a base portion adapted to be secured to a supporting surface, and a retaining portion having resilient side walls which define a C-shaped channel, the inner surface of said channel having a plurality of inward projections wherein, in use, said projections engage a pipe disposed within said channel.

Thus, only the inward projections engage and exert pressure on the pipe when the pipe is snap fitted into the clip, and the area of contact between the pipe and the clip is greatly reduced since, in the regions between the projections, there is a clearance between the inner surface of the channel and the pipe. Therefore, there is an air gap between a large proportion of the channel inner surface and the pipe and the thermal insulation therebetween is greatly increased and the disadvantage of high temperature deterioration of the clip is largely overcome. Hence, the life of the clip is extended. Furthermore, it has been found that a reduced area of contact between the clip and the pipe tends to decrease the resistance to longitudinal movements of the pipe as compared with conventional clips. Therefore, a clip according to the invention is better able to accommondate longitudinal movement of the pipe relative to the clip as a result of thermal expansion or contraction of the pipe than known clips, which is particularly advantageous in the case of plastic pipes which have a relatively large temperature coefficient of expansion.

In a preferred embodiment, the projections comprise spaced longitudinal ridges which extend along the length of the inner surface of the C-shaped channel i.e. parallel to the axis of a pipe supported in the clip. The ends of the ridges may advantageously be smoothly tapered so that, at each end of the channel, the surface of each ridge becomes flush with the inner surface of the channel. In the preferred form of the invention, the thermal insulation between the clip and the pipe is further improved by the provision of longitudinal ridges or other ridge patterns which define air channels between the pipe and the inner surface of the clip enabling circulation of air to take place as a result of a temperature differential between the pipe and the clip causing convection air currents to flow so inhibiting excess heating of the clip. Longitudinal ridges, having smoothly tapered ends, serve to further reduce the resistance to longitudinal movements of the pipe through the clip and, therefore, the stresses created in the clip due to thermal expansion of the pipe are further minimised. The preferred clip combines the above advantages with the low manufacturing costs, convenience of use and good pipe retaining properties inherently associated with snap-fitted plastic pipe clips.

The clips are preferably made of polypropylene which may advantageously contain a heat and ultra

violet stabilizer. A hold for a screw may conveniently be provided at the base of the C-shaped channel and extend entirely through the base portion so that the clip can be easily screwed to a supporting surface. The hole may be counter sunk so as to prevent interference between the pipe and the screw head.

A preferred embodiment of the invention will now be described, by way of example only, with reference to the accompanying drawings in which;

Figure 1 is a perspective view of a pipe clip according to the invention.

Figure 2 is a front elevational view of the clip shown in figure 1.

Figure 3 is a sectional view taken along line 3-3 of figure 2.

Figure 4 is a plan view of the underside of the clip shown in figure 1.

Referring to the drawings, a pipe retaining clip 1 comprises a base portion 2 and a pipe retaining portion consisting of curved side walls 3 which define a C-shaped channel 4. The base portion 2, which may be formed as an integral part of the pipe retaining portion, is cross-shaped as viewed from below and has a screw hole 5 extending completely therethrough and communicating with the channel 4. The hole 5 has a counter-sunk portion 6 and the clip may thus be screwed to, for example, a wall by a screw having a counter-sunk head so that the head of the screw becomes substantially flush with the inner surface of the channel 4 when the screw is fully tightened.

The interior surface of the channel 4 is provided with a plurality of circumferentially spaced longitudinal ridges 7 which are smoothly curved in cross-section and which extend along substantially the entire length of the channel 4. The ends 8 of the ridges 7 are smoothly tapered so that the surface of each ridge becomes flush with the channel inner surface at both ends of the channel 4. As shown in figures 1 and 3 a ridge 9 disposed at the base of the channel 4 is divided longitudinally into two sections by the countersunk portion 6 of the screw hole 5. In addition, there are inwardly projecting longitudinal ridges 10 which extend along the upper edges of the channel side walls 3. The entire clip is molded as an integral unit. The clip may be manufactured from any convenient plastic although polypropylene treated with an appropriate heat and ultra violet stabilizer is particularly suitable both in cost and ease of manufacture.

In use, the clip 1 is firmly screwed to a wall via the screw hole 5 and then a pipe 11 is snap-fitted into the channel 4 as shown in broken lines in figure 1. When the pipe 11 is disposed within the channel, the longitudinal ridges 7 engage the pipe and exert pressure thereon owing to the elasticity of the walls 3. The spaces between the ridges 7 define air channels between the pipe 11 and the clip 1 which air channels serve to greatly increase the thermal insulation between the pipe and the clip. Furthermore, the smoothly contoured longitudinal ridges allow the clip to adequetly accommodate longitudinal movements of the pipe due to thermal expansion or contraction thereof without undue stresses being imposed on the clip or its mounting.

Thus, clips according to the invention, on the one hand, are easy to manufacture and provide adequate pipe retaining properties while, on the other hand, they represent a substantial improvement over those clips currently available.

CLAIMS

1. A retaining clip of plastic material for a pipe or the like comprising a base portion adapted to be secured to a supporting surface, and a retaining portion having resilient side walls which define a substantially C-shaped channel, the inner surface of said channel having a plurality of inward projections wherein, in use, the projections engage a pipe disposed within said channel.

2. A retaining clip as claimed in claim 1 wherein the projections comprise spaced longitudinal ridges which extend along the length of the inner surface of the channel.

3. A retaining clip as claimed in claim 2 wherein the ends of the ridges are smoothly tapered so that, at each end of the channel, the surface of each ridge becomes substantially flush with the inner surface of the channel.

4. A retaining clip as claimed in any preceding claim including a screw hole extending through the base portion.

5. A retaining clip as claimed in any preceding claim formed from polypropylene treated with a heat and ultra violet stabilizer.

6. A retaining clip for a pipe or the like substantially as herein described with reference to the accompanying drawings.

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