

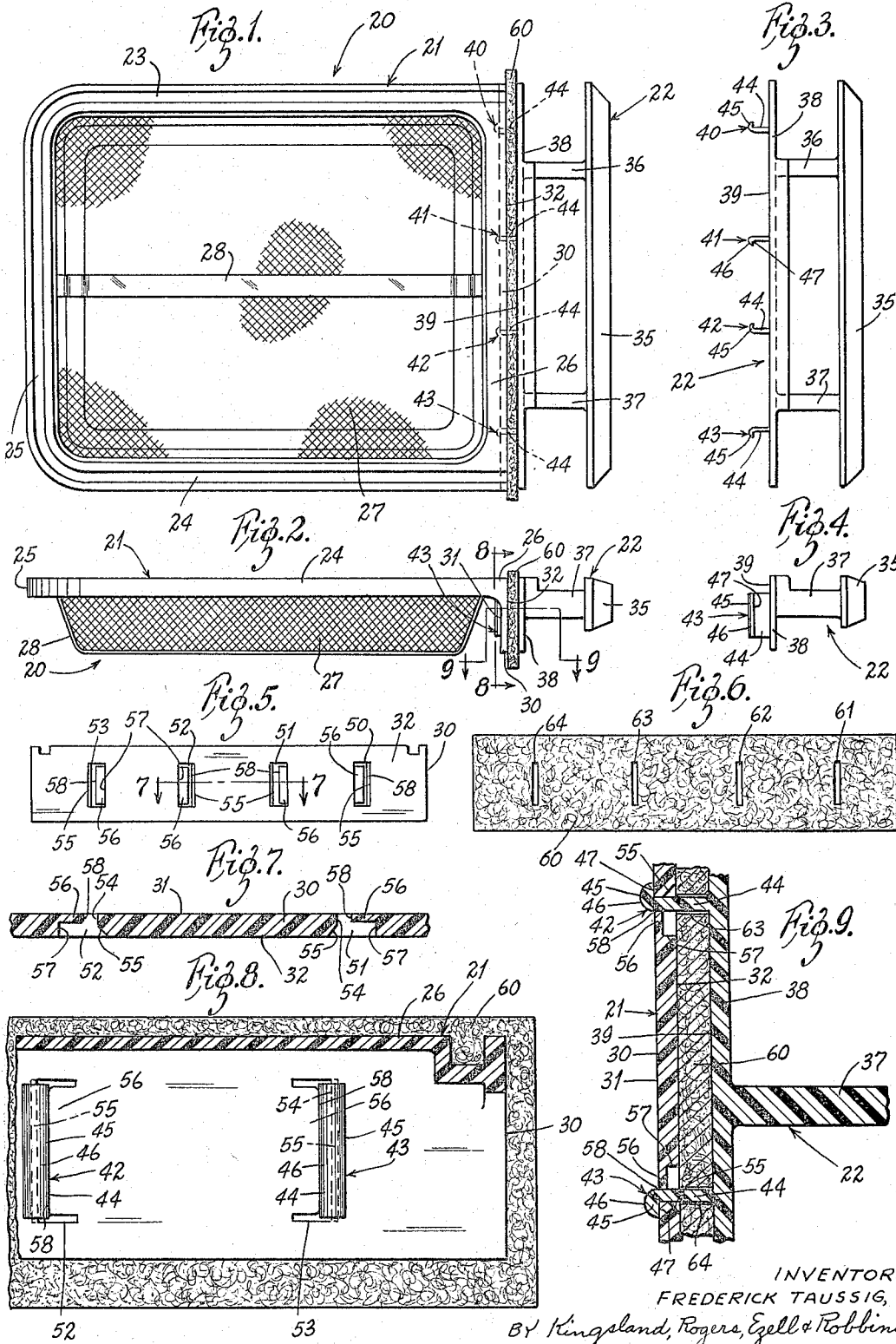
Nov. 15, 1966

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3,285,637

SNAP LOCK DEVICE FOR PLASTIC PARTS

Filed March 6, 1964



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SNAP LOCK DEVICE FOR PLASTIC PARTS

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Filed Mar. 6, 1964, Ser. No. 349,882

3 Claims. (Cl. 287-20.92)

This invention relates to a locking device for two plastic parts. The invention is particularly applicable for joining together pieces of nylon, polyethylene, polypropylene, and other wax-like compounds that cannot readily be joined by solvents or adhesives.

The locking device has interfitting elements formed on each of the parts during the molding thereof. Upon removal of the parts from their molded cavities, and before the plastic has cooled and set, the plastic has enough resilience and give to permit interlocking of the locking device elements. After the plastic has cooled and become rigid, the design of the locking device elements holds them in interlocking relation. The only way to separate the parts is to break them.

This locking device may be used as a permanent lock between any molded plastic parts. An example of two such parts is illustrated in this application. These include a filter for a clothes dryer and a handle for the filter held between these parts by the locking device.

Several of these locking devices are used between the filter and the handle parts. In each locking device, there is a hook member on one of the parts and an opening through the other part for receiving the hook member. One side of the opening is defined by a thin tab that must yield before the hook member can pass through the opening. The parts are interlocked by passing the hooks through the openings immediately upon removing the parts from their mold cavities. When the thin tabs are hot, they will yield to permit passage of the hook members. Shortly thereafter, the plastic on both parts cools and becomes rigid, and the then rigid tabs prevent the hook members from being removed from the openings.

The general object of this invention is to provide a locking device for two plastic parts that is constructed to permit interlocking of opposing elements on the two parts when they are hot, such as immediately upon removal of the parts from a mold cavity, wherein the locking device permanently fastens the two parts together once they have cooled.

Another object of the invention is to provide a locking device for two plastic parts that can be molded directly to the parts.

Still another object of the invention is to provide a locking device for two plastic parts that is so constructed that a third part may be inserted between the two plastic parts and held there when the parts are locked together.

Yet another object of the invention is to provide a locking device for two plastic parts that is of such a permanent locking nature that, to separate the parts, they must be broken. This feature of the locking device is important when visible evidence that parts have been separated is desired.

Other objects and advantages will be apparent to those skilled in the art.

In the drawing:

FIGURE 1 is a bottom plan view of a clothes dryer filter and handle held together by locking devices of this invention;

FIGURE 2 is a side elevation view of the filter and handle of FIGURE 1;

FIGURE 3 is a bottom plan view of the handle;

FIGURE 4 is a side elevation view of the handle;

FIGURE 5 is a right end elevation view of the filter

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without the handle as viewed from the left of FIGURE 4;

FIGURE 6 is a plan view of a felt seal that may be used between the filter and the handle;

FIGURE 7 is a view in section taken along the line 7-7 of FIGURE 5;

FIGURE 8 is a view in section on an enlarged scale taken along the line 8-8 of FIGURE 2; and

FIGURE 9 is a view in section on an enlarged scale taken along the line 9-9 of FIGURE 2.

Referring now to the drawing, this filter 20 comprises a frame 21 and a handle 22. The frame 21 and the handle 22 are formed entirely of injection molded plastic. The frame 21 may be of any size or shape, and as illustrated, is rectangular with sides 23 and 24, and ends 25 and 26.

A dish-shaped wire mesh screen 27 has its outer edges joined to the frame 21 during the molding process. There may be reinforcing plastic ribs 28 extending from the end 25 across the center of the screen to the other end 26.

There is a downwardly extending plate or wall 30 joined to the end 26 of the frame. The wall 30 is preferably about 1/8 inch thick between opposing flat sides 31 and 32. The wall 30 is at right angles to the plane of the frame 21.

The handle 22 comprises a grab bar 35. Two arms 36 and 37 connect the grab bar to a plate 38 that has a surface 39 parallel to the wall 30.

There are a plurality of hook members 40, 41, 42 and 43 projecting from the surface 39 of the plate 38. Each hook member 40-43 has a wall portion 44 extending at right angles from the surface 39 of the plate 38, with a hook 45 at the outer end of the wall portion. Each hook 45 extends to one side only of the wall portion 44 and has a curved outer surface 46 that intersects a straight inner surface 47. Each wall portion 44 is about 1/16 inch thick and about 3/8 inch wide. The straight surface 47 projects slightly less than 1/16 inch beyond the wall portion 44. As shown in FIGURES 3 and 9, the hooks 45 on alternate hook members 40-43 extend in opposite directions.

There are a plurality of rectangular openings 50, 51, 52 and 53 through the wall 30 on the frame 21. These openings 50-53 correspond in position to the positions of the hooks 40-43. One side 54 of each opening 50-53 has a beveled edge 55 from the side 32 of the wall 31. A tab 56 extends from the opposite side 57 of each opening 50-53, the free edge 58 of the tab 56 terminating about 1/16 inch from the side 54. Each tab 56 is about 3/16 inch wide from the edge 58 to the side 57 and is between 1/32 and 3/64 inch thick.

For this filter 20, there is a felt seal 60 fitting between the frame 21 and the handle 22. The felt seal 60 has holes 61, 62, 63 and 64 through it spaced corresponding to the spacing of hook member 40-43. The felt seal 60 is somewhat larger than the plates 30 and 38.

The frame 21 and handle 22 are assembled immediately following molding of these parts. When the parts are removed from the mold cavities, the felt seal 60 is mounted on the plate 38 with the hook members 40-43 projecting through the holes 61-64. Then the hook ends 45 of the hook members 40-43 are pressed through the openings 50-53 in the plate 30.

Since the plastic is still hot from molding, the tabs 56 will yield when they are pressed by the hook members 40-43. Also, the hook members 40-43 will bend according to forces applied to them.

As each hook member 40-43 is inserted into one of the openings 50-53, its curved outer ends 46 contacts the opposing beveled edge 55. As the hook member is pressed further through the opening, its curved outer end 46 contacts the tab 56 and deflects that tab, permitting the hook

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member to pass completely through the opening. As soon as the surface 47 reaches the end of the opening, the resilience of the tab 56 causes it to snap back to its original position and swing the hook member over to the final locking position, as illustrated in FIGURE 9. Shortly thereafter, the plastic cools and becomes relatively rigid. This causes the tabs 56 to lose their resilience and maintain a fixed position holding the hook members in place with the surfaces 47 overlying the surface 31 adjacent the openings 50-53. Thus the lock cannot be broken unless the parts are physically severed.

The sizes of parts may be varied as required by the kinds of objects being locked together. It will be apparent that the presence of the felt seal 60 requires extension of the wall 44 so that the felt seal will be compressed while still occupying space between the plates 30 and 38. Different numbers of hook members and openings 50-53 may be used, depending upon the size of parts. In all cases, the alternately directed hook members 40-43 provide a stronger lock that resists relatively sliding of the parts.

Various changes and modifications may be made within the purview of this invention as will be readily apparent to those skilled in the art. Such changes and modifications are within the scope and teaching of this invention as defined by the claims appended thereto.

What is claimed is:

1. A locking device for two plastic parts comprising a pair of hook members on one part, a wall on the other part, a pair of holes through the wall positioned complementary to the positions of the hook members, the hook members each having a shank portion for extending through a hole far enough to position an end of the shank beyond the wall, each hook member having a laterally projecting hook portion on the last-named end of the

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shank portion, the hook portions being oppositely facing and being positioned for contacting the surfaces of the wall beyond the holes, the portions of the wall which define the sides of the holes opposite the hook portions being formed as tabs extending at substantially right angles to the shank portions, the tabs being yieldable when the hooks are passed through the hole, the parts being molded plastic, the oppositely directed hook portions preventing the parts from sliding laterally to free the hook portions from the holes.

2. The device of claim 1 wherein one of the parts is a filter frame and the other part is a handle structure for attachment to the frame.

3. The device of claim 2 wherein the handle structure also has a plate facing the wall, and a felt seal between the wall and the plate having holes through which the shank portions extend, and having a border margin extending beyond the peripheral edges of the wall and the plate.

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