

The invention relates to a plastics processing machine and to a process for rapid change-over of the plastics processing machine from a first product mould to a second product mould.

A plastics processing machine of this type may for example be an injection moulding machine or a blow moulding machine; such plastics processing machines are generally known. A blow moulding machine of this type is known from GB-A-1 251 422.

These machines have the following problem: a manufacturer of plastics hollow bodies has for example only one blow moulding machine available, on which he normally manufactures large-volume vessels having a volumetric capacity of for example 220 l. He has now received a limited order, for example for 60-litre plastics canisters, which he would like to fulfil in the mean time. For this, the blow moulding machine must be brought to a standstill and the blowing mould for the 220-litre vessels must be demounted from the mould clamping plates, and peripheral supply lines must also be demounted. Thereafter, the smaller blowing mould halves for the 60-litre plastics canister are secured to the mould clamping plates and the appropriate operating means lines, for example for electrical energy, hydraulic oil or cooling water, are attached. After fulfilling the canister order, the 220-litre vessels are to be produced again and reassembly of the product moulds has to take place again in the opposite order. As a result, comparatively long standstill times and high breakdown costs occur at the blow moulding machine.

The same is true for an injection moulding machine when changing injection moulds. Here, even with relatively short standstill times, comparatively high production losses result, since with an injection moulding machine it is usual

for larger unit quantities of products to be achieved than for example with a discontinuously operating blow moulding machine.

It is thus the object of the present invention to specify process engineering and constructional measures which make it possible in a simple and low-cost manner to change over a plastics processing machine rapidly and for a short time from one product mould to another second product mould and to keep the machine breakdown times caused thereby as low as possible.

This object is achieved within the realm of process engineering, in accordance with the invention, with a plastics processing machine having a mould divided into two, whereof the mould halves are secured to two mould clamping plates which may be moved apart for product removal, in that the mould halves of the first product mould remain on the mould clamping plates, and the mould halves of the second product mould are clamped onto the remaining mould halves of the first product mould. Advantageously, the molten raw plastics material to be processed and/or the operating means, such as electrical energy, hydraulic oil or cooling water, are supplied and in some cases removed again by means of changeable pipelines and/or flexible (hose) lines and cables.

To this end, it is provided as a constructional arrangement for the mould halves of the first product mould clamped onto the mould clamping plates to have on their inwardly facing sides additional securing means for clamping on the mould halves of a second product mould.

As a result of these measures, the machine standstill times and the production loss times are perceptibly shortened in a simple manner. With program-controlled

plastics processing machines, it is possible here to continue to operate the machine without readjusting the program, if a spacer which may be adjusted to a fixed position is provided in the closure path of the mould halves which may traverse horizontally, so that the machine parts or mould clamping plates, which may be moved apart, may be moved together in defined manner to a limited, freely pre-selectable spacing.

Especially when such machine change-overs have to be carried out relatively often at short time intervals, it may be advantageous if, for supplying or removing molten plastics and/or operating means such as hydraulic oil or cooling water, changeable pipelines or flexible hose lines or current cables, where appropriate having quick-closing mechanisms (e.g. bayonet closures) or insertion-type connections, are provided.

The blowing mandrel can be rapidly adapted to another product blowing mould, in the case of a blow moulding machine, by placing a lengthening piece on top of the blowing mandrel.

It is obvious from the above description that it is possible with simple means and in a manner which is simple per se to achieve a low-cost mode of operation with a relatively high production work-load in a capital-intensive plastics processing machine.

The invention is described and explained in more detail below with reference to an example embodiment illustrated in the drawing.

The single figure in the drawing illustrates a blow moulding machine 10 in side view.

The blow moulding machine 10 comprises a base frame 34 and a vertical support 36 on which there are substantially secured the hydraulic drives for traversing of the mould clamping plates 16, 18 in the horizontal direction. For guiding the mould clamping plates 16, 17, an upper horizontal support 38 and a lower horizontal support 40 are provided. Arranged between the two mould clamping plates 16, 18 there is, at the bottom on the base frame 34, a blowing mandrel block 42 with the blowing mandrel 32 for inflating a tubular plastics preform which is pressed out of a reservoir head 28 arranged directly above it, above the mould clamping plates, or out of the tubular die thereof. Secured to the mould clamping plates 16, 18 are conventionally the mould halves of the plastics hollow body or product to be blown in each case. With complicated product moulds having undercuts, e.g. flange rings on vessel bodies or moulded-on handles in the case of canisters, the mould halves can in each case be provided with separately displaceable mould slides.

The functioning of a blow moulding machine of this type is generally known and does not need to be explained further.

The mould halves 12, 14 clamped onto the mould clamping plates 16, 18 here are designed for a 220-litre capped vessel. This first product mould is drawn in in dotted lines in the two mould halves 12, 14. The mould halves 12, 14 are provided at top and bottom with mould slides for forming peripheral carrying and transport rings by upsetting.

In accordance with the invention, the mould halves 12, 14 of the first product mould are provided with securing means 20, such as angle irons with threaded holes, for clamping on two mould halves 22, 24 of a second product mould. The mould halves of the second product mould are provided for manufacturing 60-litre plastics canisters and

each have at their lower ends a mould slide for forming a handle in the canister wall by upsetting. The amount by which the mould slides can be displaced is indicated by two vertical arrows, and the amount by which the mould halves or mould clamping plates can traverse is indicated by a horizontal arrow.

In order to be able to mould the smaller canisters, the blowing mandrel 32 suited for the large-volume vessel is provided with a suitable lengthening piece 30 for the canister blowing mould halves 22, 24, which similarly have appropriate securing means. To adjust the amount by which the mould clamping plates can be displaced horizontally, or as a stop therefor, there is provided on the lower horizontal support 40 a spacer 26 which may be adjusted to a fixed position and by means of which a simple adaptation of the moving machine parts to the additional mould halves may be carried out.

The blowing mould halves are, in conventional manner, each provided with hydraulic lines - for actuating the mould slides - and coolant lines.

For rapid reassembly, these pipelines or flexible hose lines are equipped with quick-closing mechanisms or insertion-type connections, which are not shown in more detail in the drawing for the sake of better clarity.



CLAIMS

1. Process for rapid change-over in a plastics processing machine from a first product mould to a second product mould, having a mould divided into two, whereof the mould halves are secured to two mould clamping plates which may be moved apart for product removal, characterized in that the mould halves (12, 14) of the first product mould remain on the mould clamping plates (16, 18), and the mould halves (22, 24) of the second product mould are clamped onto the remaining mould halves (12, 14) of the first product mould.

2. Process according to Claim 1, characterized in that the molten raw plastics material to be processed and/or the operating means, such as electrical energy, hydraulic oil or cooling water, are supplied and in some cases removed again by means of changeable pipelines and/or flexible (hose) lines and cables.

3. Plastics processing machine having a mould divided into two, whereof the mould halves (12, 14) are secured to two mould clamping plates (16, 18) which may be moved apart for product removal, characterized in that, for rapid change-over from a first product mould to a second product mould, the mould halves (12, 14) of the first product mould clamped onto the mould clamping plates (16, 18) have securing means (20) for clamping on mould halves (22, 24) of a second product mould.

4. Plastics processing machine according to Claim 3, characterized in that a spacer (26) is provided so that the machine parts or mould clamping plates (16, 18), which may be moved apart, may be moved together to a freely pre-selectable spacing.

5. Plastics processing machine according to Claim 3 or 4,



characterized in that changeable pipelines or flexible hose lines, where appropriate having quick-closing mechanisms or insertion-type connections, are provided for supplying or removing molten plastics and/or operating means such as hydraulic oil, cooling water or electrical current.

6. Plastics processing machine according to Claims 3, 4 or 5, characterized by a construction as a blow moulding machine (10), the blowing mandrel (32) being provided with a lengthening piece (30) for inflating the plastics hose.