

DUPLICATE

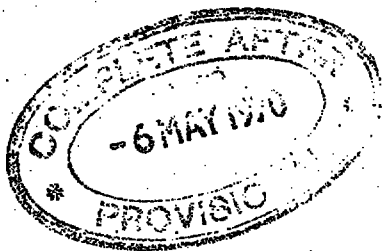
PATENTS ACTS 1949 to 1961

25301
1969

16 NOV 1971

No. 25302/69

Date. 19.5.69.



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Date. 19.5.69.

COMPLETE SPECIFICATION

COGNATE

" BATTERY BOXES "

We, JOSEPH LUCAS (INDUSTRIES) LIMITED, of Great King Street, Birmingham 19, a British Company, do hereby declare the invention for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:-

This invention relates to apparatus for injection moulding battery boxes.

Apparatus according to the invention comprises a pair of die parts between which the die cavity is defined, a plurality of inlet passages in one die part through which molten resin flows into inlet zones in the die cavity and thence from the inlet zone to the remainder of the die cavity, and flow restrictors between the inlet zones and the remainder of the die cavity.

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Preferably, the flow restrictors are defined by the die parts.

In the accompanying drawings,

Figure 1 is a part sectional view of part of injection moulding apparatus according to one example of the invention,

Figure 2 is a sectional view to an enlarged scale corresponding to part of Figure 1,

Figure 3 is a sectional view taken at right angles to Figure 1, and

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Figure 4 is a perspective view of an insert used in the apparatus,

Referring to the drawings, the injection moulding apparatus includes a pair of die parts 11,12 between which the die cavity 13 is defined. The die cavity is of the same configuration as a thin-walled battery box which is to be formed, the battery box having a base, four side walls, and partition walls extending between the longer side walls to the shorter side walls.

The die part 12 is formed with a plurality of inlets 14 terminating in inlet ports 15 through which molten resin can flow, into the die cavity. Supported by the die part 12 is a hot runner box 16 which is thermally insulated from the die part 12 by a plate 17. The box 16 has an inlet 18 communicating with a passage 19. The resin is fed to the inlet 18 by a feeder 22 by way of a nozzle 24. The resin within the feeder 22 is heated by heater 23, and while the resin is within the passage 19 it is kept hot by heating coils 25 seen in Figure 3.

Within each inlet 14 is provided a device which is best seen in Figure 2. The device includes an outer member 26 which is in screw-threaded engagement with one wall 27 of the hot runner box 16, the wall 27 defining with the remainder of the box 16 the passage 19. Within the member 26 is a passage 31 establishing communication between the ports 15 and ports 21 in the wall 27, the ports 21 communicating with the passage 19. The passage 31 includes a cylindrical portion adjacent the port 21 and a truncated conical portion adjacent the port 15. Within the passage 31 is an insert 28 seen in Figure 4. The insert 28 has a conical portion 28a which extends within the truncated conical portion of the member 26 but protrudes therefrom and terminates within the port 15, and a plurality of radially extending plates 29 at the rear end of the portion 28a, the plates 29 occupying the cylindrical portion of the passage in the member 26, and being in physical contact with the member 26. Thus, molten resin in the passage 19 flows to the port 15 by way of the port 21, the

plurality of channels into which the passage 31 is divided by the plates 29 and the member 26, and then through the annular space between the member 26 and the portion 28a. The member 26 and insert 28 are formed from material which conducts heat readily, and so there is a transfer of heat from the wall 27 by way of the member 26 and insert 28 to the resin, so that the resin continues to be heated until the moment it reaches the port 15. Resin also flows between the member 26 and die part 12 to provide thermal insulation therebetween.

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From the port 15 the resin flows into the die cavity, which includes inlet zones 32 communicating with the ports 15. The inlet zones communicate with the remainder of the cavity, indicated at 33 in Figure 5, by way of restrictors 34 which are conveniently formed simply by shaping the die parts 11,12. In particular example shown, the walls of the battery box are to be 0.090 inches in thickness, and the dimension of the restrictor 34 is 0.040 inches.

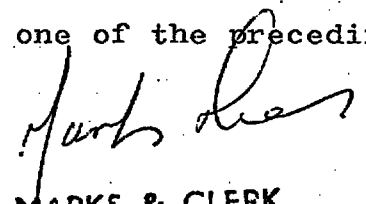
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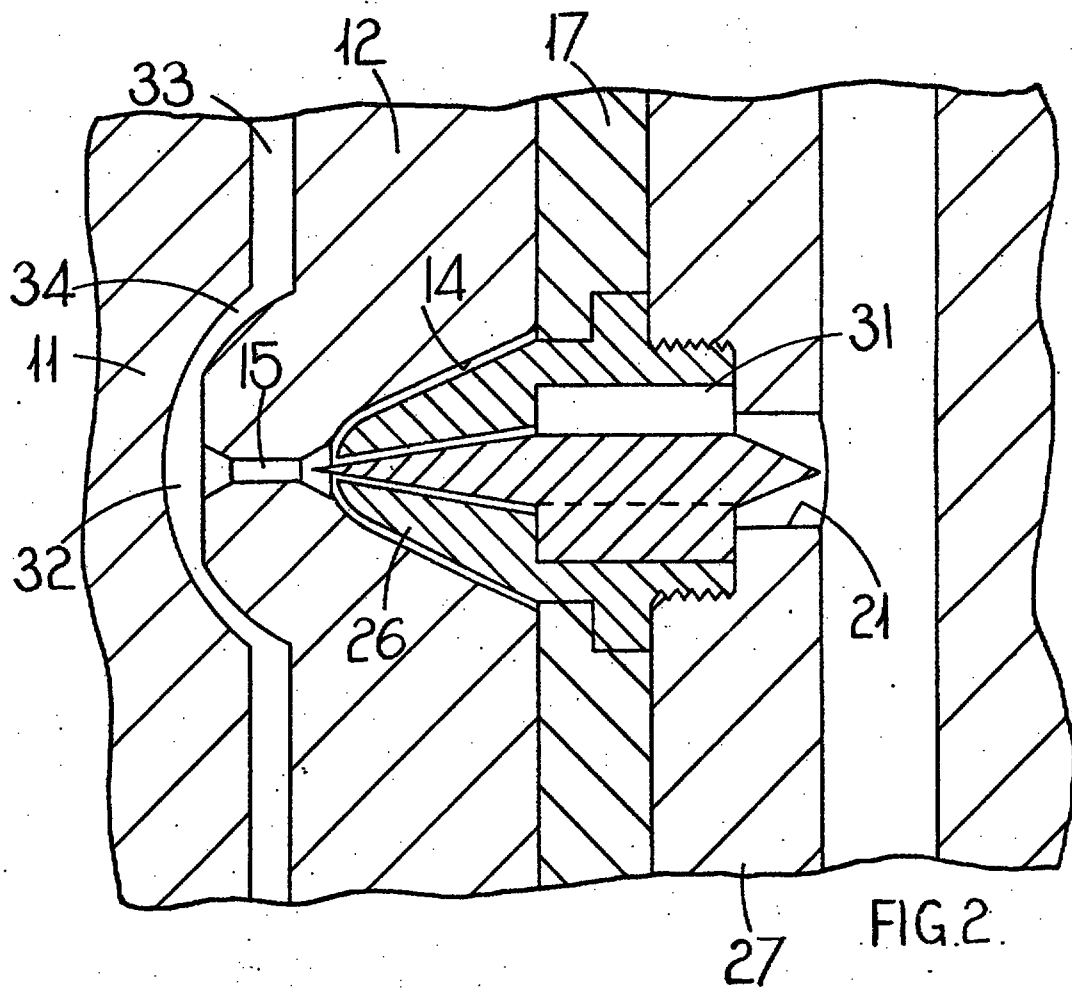
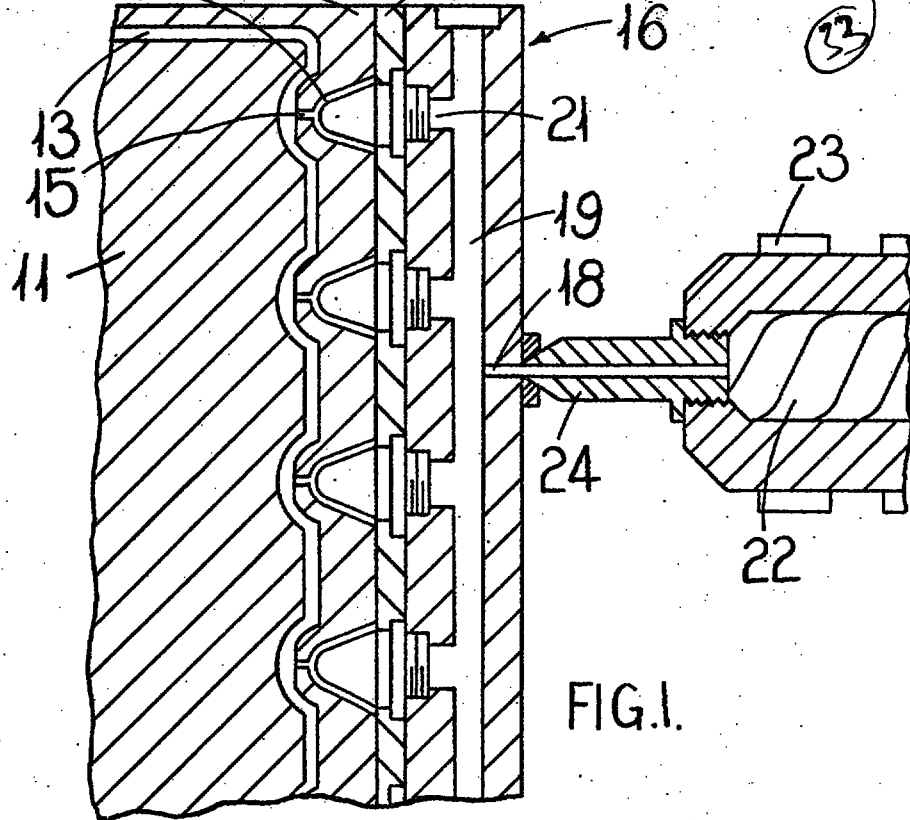
In moulding a thin-wall battery box, it is difficult where the box is relatively tall to ensure that sufficient resin flows to form the top of the walls of the box. The two primary features described above alleviate this difficulty considerably. The restrictors 34 ensure a more even flow of the resin, and the provision of baffle means within the passage 31 to keep the resin heated until the moment it reaches the ports 15 minimises the risk of the resin setting before reaching the tops of the walls.

After injection of the molten resin into the die cavity the screw feed then recharges ready for the next injection.

The pressure build up within the screw feed cylinder is relieved by axial movement of the screw away from the machine nozzle 24. When the next injection is required the screw is moved axially towards the nozzle 24.

1. Apparatus for injection moulding battery boxes comprising a pair of die parts between which the die cavity is defined, a plurality of inlet passages in one die part through which molten resin flow into inlet zones in the die cavity and thence from the inlet zones to the remainder of the die cavity, and flow restrictors between the inlet zones and the remainder of the die cavity.
2. Apparatus as claimed in claim 1 wherein said flow restrictors are defined by the die parts.
3. Apparatus as claimed in claim 1 or claim 2 wherein heated baffle means are provided within said inlet passages for minimising changes in the temperature of the resin as the resin flows through said passages.
4. Apparatus as claimed in claim 3 wherein a heated runner box is provided for supplying molten resin to said inlet passages said baffle means being heated by conduction of heat from the runner box.
5. Apparatus for injection moulding battery boxes comprising the combination and arrangement of parts substantially as described with reference to the accompanying drawings.
6. A battery box wherever manufactured by a process utilising apparatus as claimed in any one of the preceding claims.


MARKS & CLERK
CHARTERED PATENT AGENTS
AGENTS FOR THE APPLICANT(S)



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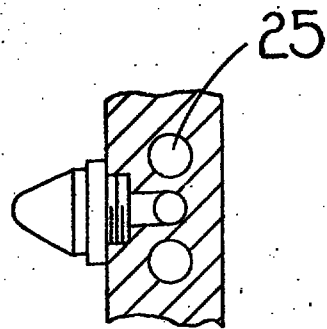


FIG. 3.

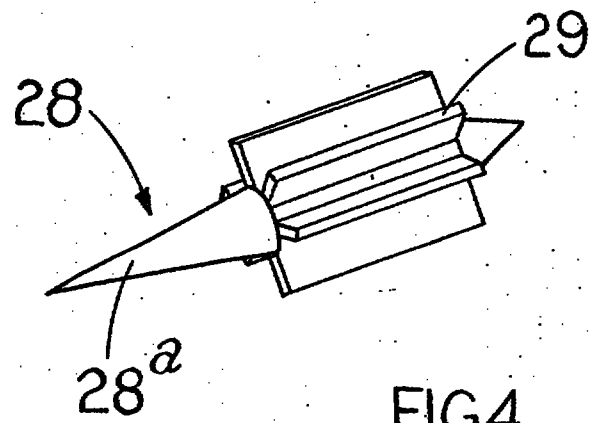


FIG. 4.

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