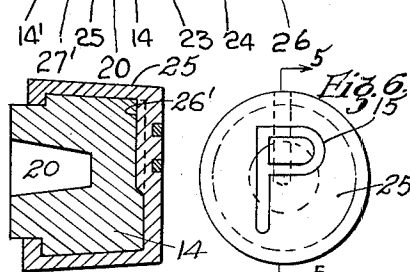
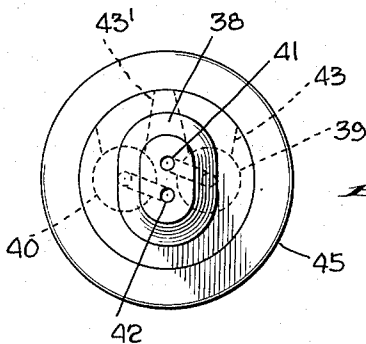
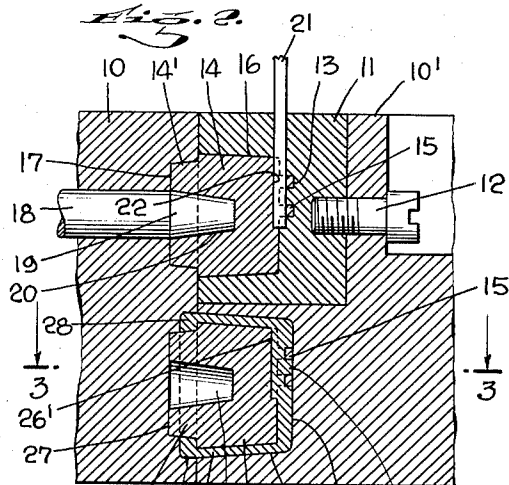
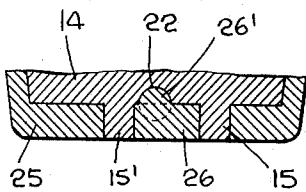
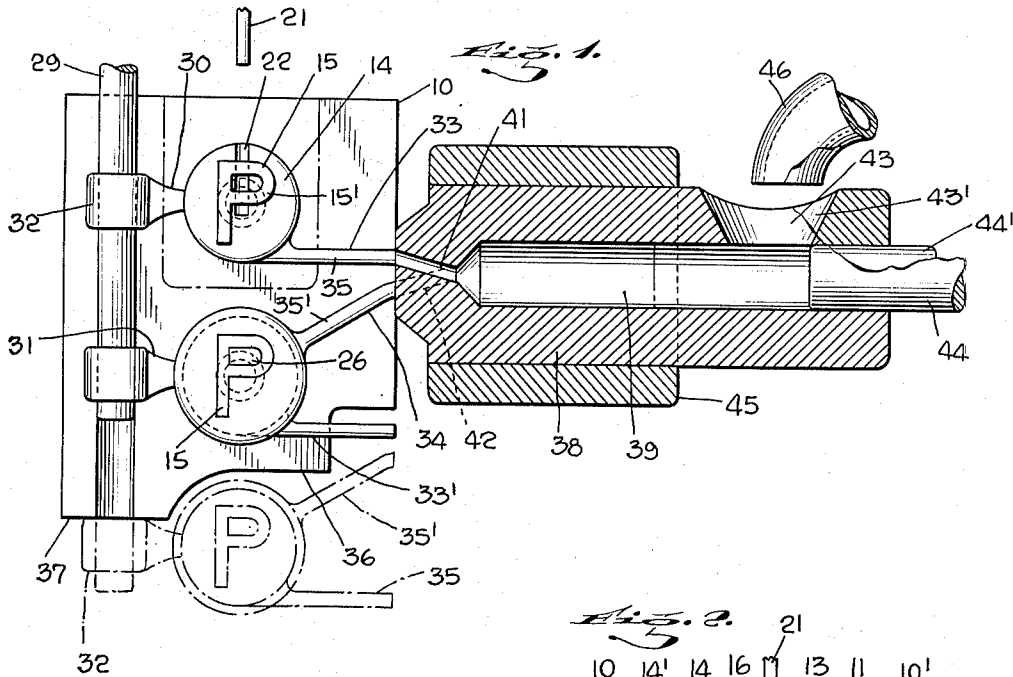


Aug. 9, 1955

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DIE CAST PLASTIC KEYS AND THE
METHOD OF FORMING THE SAME
Filed Aug. 25, 1950

2,714,949



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DIE CAST PLASTIC KEYS AND THE METHOD OF FORMING THE SAME

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Application August 25, 1950, Serial No. 181,520

9 Claims. (Cl. 197—102)

This invention relates to characterized keys, that is to say, keys having letters, numerals or other characters thereon, such as used on typewriters, calculating machines and the like. More particularly, the invention deals with a device of this type and kind made from two-color plastics so that the character of the key will be readily readable. Still more particularly, the invention deals with a method of producing keys of the kind under consideration. The novel features of the invention will be best understood from the following description, when taken together with the accompanying drawing, in which certain embodiments of the invention are disclosed and, in which, the separate parts are designated by suitable reference characters in each of the views and, in which:

Fig. 1 is a diagrammatic sectional and face view of part of an apparatus employed for producing two-color plastic keys, illustrating the formation of keys and also indicating in dot and dash lines the final stripping of a formed key from the dies.

Fig. 2 is a sectional view through a pair of dies illustrating the steps in the method of producing the resulting key.

Fig. 3 is an enlarged partial section on the line 3—3 of Fig. 2, showing only the front portion of a completely formed key;

Fig. 4 is a face view of the nozzle end of the plastic feed cylinders of the machine;

Fig. 5 is a section through 5—5 of Fig. 6 showing the completed article of manufacture, i. e., typewriter or calculator key; and

Fig. 6 is a top plan view of the completed key showing the letter P outlined thereon.

My present invention deals with the formation of characterized keys for use in connection with typewriters, calculating machines and the like and, particularly, to keys formed from two-color plastics so that the character will be readily readable with respect to the background color of the key body as a whole.

In constructing keys of the kind under consideration, difficulty is experienced in forming completely outlined characters as, for example, the letter "P," wherein part of the body portion of the key is usually surrounded by the formation of the character, in other words, the loop of the "P." One of the features of my invention is to provide a method, whereby core means is provided to extend into and across the area of the closed loop so that, in forming the final facing body, access is provided for extending the material of the casing into the area completely closed by the loop portion of the character. Many letters of the alphabet and other characters or designs have characteristics of this type and kind.

From another standpoint, the formation of the bonding or bridging channel by the use of the core member also produces in the finished casting additional means of anchorage and reinforcement of the two parts, one with respect to the other.

In the accompanying drawing, I have diagrammatically shown, to illustrate one adaptation of my invention, a

pair of dies 10, 10', a face view of the die 10 being seen in Fig. 1 and a section through the dies in Fig. 2. In this figure, it will be noted that a die insert 11 is detachable with respect to the die part 10' as by a screw 12 so that character impressions can be readily changed. In the construction shown, the insert 11 has an impression 13 outlining the letter "P," so that, in forming the first cast member 14, the letter "P" 15 will appear on the outer surface thereof. The insert 11 has a relatively large cavity 16 to form the member 14 and this cavity opens into a somewhat smaller cavity 17 in the die 10.

Arranged in and movable relatively to the die 10 is a core pin 18 having a tapered end 19 to form a tapered socket 20 in the member 14 to facilitate mounting of the member upon a suitable support. In this connection, it will be understood that the socket 20 may be of any desired suitable formation.

Arranged in and movable relatively to the die insert 11 is another core 21, approximately one-half of which extends into the body portion of the member 14 and the other half of which extends into the loop portion 15' of the character 15, as will clearly appear from a consideration of the cavity 22 formed in the member 14 by the core 21. The halves of the core referred to are those formed by passing a plane through the longitudinal axis of the core, resulting in two halves each having a semi-cylindrical cross section. It will also be noted that the core extends axially across and beyond the loop portion 15'.

Below the insert 11, the die 10' has a cavity 23 larger in size than the member 14 and extended in depth to the wall 24. The outer surface of the formed character 15 on the member 14 rests against the surface of wall 24, as will clearly appear from a consideration of Fig. 2 of the drawing. In other words, the cavity 23 facilitates the formation of a secondary cast member 25 in the form of a shell which completely envelopes that part of the member 14 within the cavity 23, except for the outer surface of the character 15, so that, in forming the secondary cast member 25, the plastic material of said member is free to flow into and fill the area within the loop portion 15' of the character 15, in other words, the portion 26, within the character 15, in Fig. 1 of the drawing.

In Fig. 1, it will be apparent that the die 10', including the insert die 11, is removed from the die 10 so as to clearly illustrate a face view of the die 10 as and when the dies would be separated.

The die 10 has a cavity 27 for receiving the reduced portion 14' of the member 14 and also to form around the reduced portion sufficient clearance for formation of a retaining flange 28 on the member 25, thus securely retaining the parts against displacement.

Returning now to a consideration of Fig. 1 of the drawing, it will appear that adjacent surfaces of the dies, at one side of the cavities, have on the parting line, recesses for reception of a transfer core 29 and further recesses 30 and 31, the recess 30 facilitating the formation of an integral runner or supporting portion 32 on the cast member 14; whereas, the recess 31 receives the member 32 when positioned for registration with the cavities 23 and 27.

Also on the parting line of the dies are formed gate passages 33 and 34, the passage 33 extending to the cavities 16 and 17; whereas, the gate 34 extends to the cavities 23 and 27. The dies also have a gate receiving recess 33' for receiving the gate member 35 of the casting 14, when said casting is positioned in the lower cavities of the dies, as will later be apparent. The lower portion 36 of the dies is cutaway to receive the finished casting, as indicated in dot and dash lines and is provided fur-

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ther with a lower stripper surface 37 for stripping the casting from the transfer core 29.

Considering now Figs. 1 and 4 of the drawing, 38 represents a dual nozzle construction having two injection cylinders or bores 39 and 40, the cylinder or bore 39 being shown in section in Fig. 1 of the drawing. These bores have passages 41 and 42, respectively, which open outwardly through the face of the nozzle to simultaneously register with the gates 33 and 34. Each cylinder has an admission opening 43, 43' for introduction of the plastic material and pistons or plungers 44, 44' are employed to pressure inject the casting material into the cavities to simultaneously form, in one operation of both pistons or plungers, a cast member 14, as well as a cast member 25.

Suitable means is provided for heating the plastic material, as is known in the art, but this means is not shown, as it forms no direct part of the present invention. However, at 45 is shown diagrammatically a portion which might, for purposes of illustration, be regarded as the heater. At 46 is indicated means for guiding plastic material into the cylinders. It will be understood that each cylinder has a different color plastic material and a sufficient quantity of the material is maintained in the respective cylinders so as to provide the necessary heating time consistent with meeting the requirements for forming the respective castings and, in this connection, it must be kept in mind that the illustrations in the accompanying drawing are purely diagrammatic.

In Fig. 2 of the drawing, the various parts of the dies are shown in their casting position, that is to say, one cast member 14 has been formed on the core 18, as well as on the core 21 and, taking up the method from this position, the procedure is as follows.

The core 21 is first withdrawn from the insert 11 and moved into a raised position, as indicated in Fig. 1 and, at this time, the core 18 is withdrawn from the cavity 20, after which the dies are separated and the transfer core 29 is moved from the full line position indicated in Fig. 1 to the dotted line position of said figure which moves the lowermost or complete casting into the position shown in dot and dash lines with the member 32 beneath the surface 37. The dies are then partially closed and the transfer core is moved upwardly to the full line position thus stripping the casting, whereupon the dies are completely closed and another dual casting operation is performed, forming another member 14 in the cavities 16, 17 around re-positioned cores 18 and 21 and a casting 25 on the member 14 within the cavities 23, 27, thereby the above described operation of the transfer core and movement of the cores 18 and 21 is repeated, as will be apparent.

Considering Fig. 3 of the drawing, it will be apparent that, when the portion 26 is formed within the loop portion 15' of the character 15, a part of the cast material, in the form of a semi-circular elongated bar 26' is embedded within the member 14 and forms a key or reinforcing member, as will be apparent. However, the channel 22 has its primary importance in establishing the transfer passage to extend the material forming the cast member 25 into the loop portion 15'. It will also be apparent that that part of the loop portion 15', where the core 21 is arranged, will be somewhat thinner than the remaining portion of the character 15.

In producing castings of the type and kind under consideration, it will be apparent that a completely formed two-color key will be produced in each casting operation of the machine and, if desired, suitable means may be provided to trim the casting to remove the gate member 35, as well as the gate member 35', while the casting is at the dot and dash station, seen in Fig. 1 and, at the same time, the member 32 can be removed. On the other hand, this operation can be performed at a totally remote station.

From time to time, the insert 11 will be changed to produce different characters consistent with demands, the

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remaining structure of the casting being otherwise the same, that is to say, the body member 14 of the casting will also be of one general contour, consistent with the demand, particularly with respect to the formation of the socket 20.

It will be apparent from a consideration of Figs. 1 and 2 that the members 32, 35 and 35' are disposed on the parting line of the dies which facilitates trimming of the resulting casting. This die parting line is arranged between the body member 14 and the short reduced end 14'. These portions of the casting are reversely tapered, as will be apparent for free removal from the die cavities and the same principle is maintained in the cavities 23 and 27, excepting that the cavity forming the hook flange 28 will have a substantially straight wall, as at 27', Fig. 2.

The passage 22 formed by the core 21 or the resulting bar portion 26' may be said to comprise a bridging portion which will transverse any area of a character and, particularly, an area which is completely encircled by a portion of the character. For purposes of description, the body member 14 may be said to comprise a character supporting body or a body including an integral character portion; whereas, 25 simply comprises a jacket or enclosing shell which substantially covers the body 14 and, further, provides a facing around the character portion of said body.

The finished key, which is adapted for use in machines like typewriters and calculating machines, is shown in Figs. 5 and 6. It comprises the core member 14 and the sheath member 25. The core member shows through the top of the sheath member to outline the letter P shown at 15. The core member 14 has a recess 20 adapted to receive the end of the lever upon which the key is designed to be placed.

Having fully described my invention, what I claim as new and desire to secure by Letters Patent is:

1. A moulded two-color plastic key comprising a body having a reduced hollow mounting end, said body having an integral character portion protruding from the other end thereof, said body and character portion being formed from one color plastic, a one-piece shell enveloping all of said body except part of the mounting end and outer surfaces of said character portion, said shell having a hook flange portion engaging the body around said reduced mounting end and inwardly of the outer surface of said mounting end to retain the shell against displacement from said body, the second named end of said body having a recess traversing and bridging spaced parts of the character portion inwardly of the outer surface of said character portion, and the shell having an integral part disposed in said recess.

2. A plastic key for typewriters, calculating machines, and the like comprising a core, an indicia on said core characterized by having an enclosed portion, said indicia comprising projecting members extending outwardly from one end portion of the core, an opening through a projecting member defining said enclosed portion and disposed below the outer end surface of said member, a one-piece shell enclosing said end portion of the core and having recesses therein corresponding to, and exposing to view, the outer end surfaces of said projecting members, said shell having an integral part disposed in said opening, and means for anchoring the shell to the core.

3. A die cast article comprising a core, an indicia on said core characterized by having an enclosed portion, said indicia comprising projecting members extending outwardly from one end portion of the core, an opening through at least one of the projecting members defining said enclosed portion and disposed below the outer end surface of said member, a one-piece shell enclosing said end portion of the core except the outer end surfaces of the projecting members, and said shell having an integral part disposed in said opening.

4. A die cast article comprising a core, an indicia on said core, said indicia comprising projecting members ex-

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tending outwardly from one end portion of the core, an opening through at least one of the projecting members, said opening being disposed below the outer end surface of said one projecting member, a one-piece shell enclosing said end portion of the core except the outer end surfaces of the projecting members, and said shell having an integral part disposed in said opening.

5. A plastic key for typewriters, calculating machines, and the like comprising a core of substantially circular cross-section having an outer end face and an apertured inner end face, an annular shoulder adjacent the inner end face, said core being tapered from the shoulder to the outer end face and tapered from the shoulder to the inner end face, a character portion on the outer end face comprising outwardly extending projecting members defining an enclosed portion, an elongated cavity in said outer end face extending from an intermediate point thereof to the peripheral edge of said face, said cavity opening outwardly through said end face and laterally through said peripheral edge, said cavity also tunneling through the projecting members defining said enclosed portion, an integral one-piece shell enclosing the outer end face and tapered outer sides of the core and comprising an outer wall integrally joined to curved side walls, said side walls terminating in an inner flanged portion which engages said annular shoulder to anchor the shell to the core, said outer wall having recesses therein corresponding to and exposing to view the surfaces of said projecting members, said outer wall having a piece disposed in said enclosed portion and also having an integral part on the undersurface thereof which extends into said cavity and is integrally connected to the underside of said piece, and said character portion and outer wall being of different colors.

6. A plastic key for typewriters, calculating machines, and the like comprising a core of substantially circular cross-section having an outer end face and an inner mounting end, a ridge adjacent the inner end, said core being tapered from the ridge to the outer end face and tapered from the ridge to the inner end, a character portion on the outer end face comprising outwardly extending projecting members defining an enclosed portion, a cavity in said outer end face opening outwardly thereof and tunneling through the projecting members defining said enclosed portion, a shell enclosing the outer end face and tapered outer sides of the core and comprising an outer wall joined to curved side walls, said side walls having a recessed portion adjacent the inner end of the shell which engages said ridge to anchor the shell to the core, said outer wall having recesses therein corresponding to and exposing to view the surfaces of said projecting members, said outer wall having a piece disposed in said enclosed portion and also having an integral part on the undersurface thereof which extends into said cavity and is integrally connected to the underside of said piece, and said character portion and outer wall being of different colors.

7. A plastic key for typewriters, calculating machines, and the like comprising a core having an outer end face

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and an inner mounting end, said core having an outwardly tapered outer end portion, a character portion on the outer end face comprising outwardly extending projecting members, a cavity in said outer end face opening outwardly thereof and tunneling through a projecting member, a shell enclosing the outer end face and tapered portion of the core and comprising an outer wall joined to side walls, interengaging means on the core adjacent the inner end thereof and on the side walls of the shell for anchoring the shell to the core, said outer wall having recesses therein corresponding to and exposing to view the surfaces of said projecting members, said outer wall having an integral part on the undersurface thereof which extends into said cavity, and said character portion and outer wall being of different colors.

8. A die cast article comprising a core having an outer end face and an inner portion, a character portion on the outer end face comprising outwardly extending projecting members, a cavity in said outer end face opening outwardly through said end face and laterally through a peripheral edge of said face, said cavity also tunneling through a projecting member, an integral one-piece shell enclosing the outer end face and sides of the core and comprising an outer wall integrally joined to an inner portion, interengaging means on the inner portions of the shell and core for anchoring one to the other, said outer wall having recesses therein corresponding to and exposing to view the surfaces of said projecting members, and said outer wall having an integral part on the undersurface thereof which extends into said cavity.

9. A die cast article comprising a core having an inner portion and an outer portion terminating in an outer end face, a character portion on the outer end face comprising outwardly extending projecting members, a cavity in said outer end face tunneling through a projecting member, an integral one-piece shell enclosing the outer end face and outer portion of the core and comprising an outer wall integrally joined to an inner portion, interengaging means on the inner portions of the shell and core for anchoring one to the other, said outer wall having recesses therein corresponding to and exposing to view the surfaces of said projecting members, and said outer wall having an integral part on the undersurface thereof which extends into said cavity.

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