Oct. 29, 1968 R. B. CUBITT 3,408,436

METHOD FOR MAKING COMPOSITE DIE

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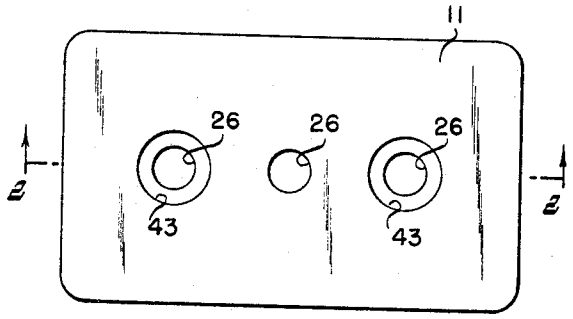

Fig. 1

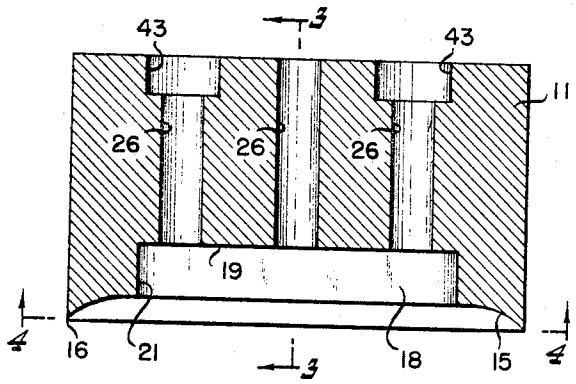

Fig. 2

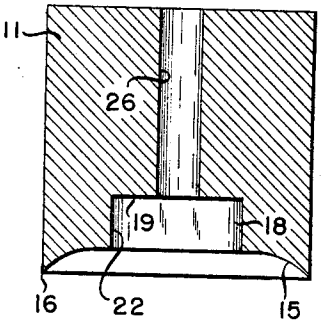

Fig. 3

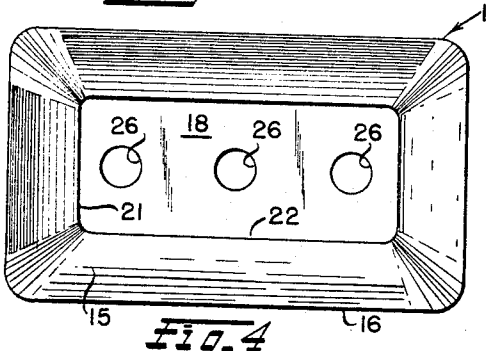

Fig. 4

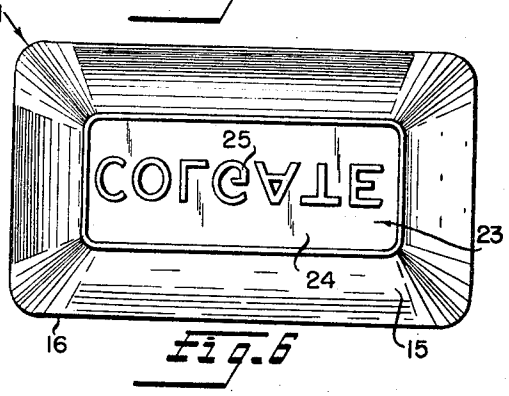

Fig. 6

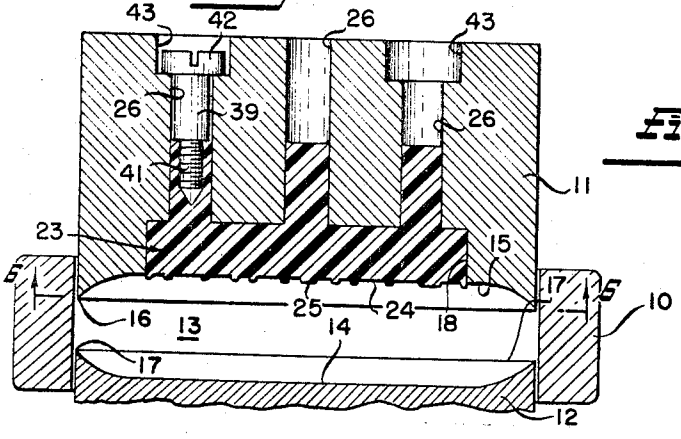

Fig. 5

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METHOD FOR MAKING COMPOSITE DIE

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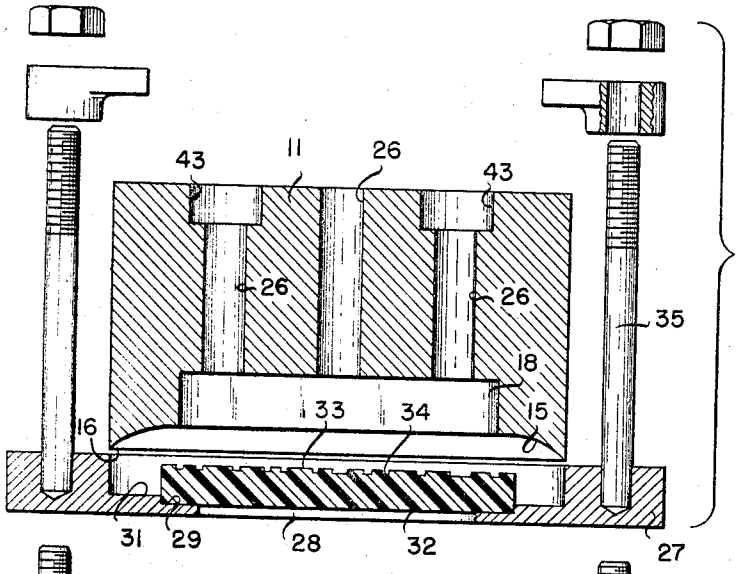

Fig. 1

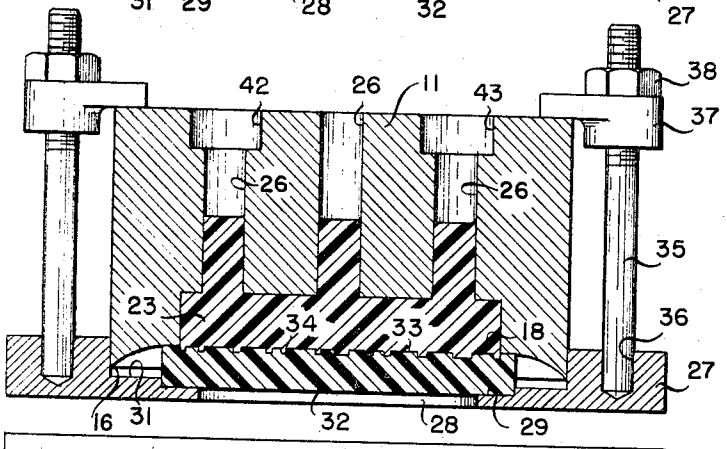

Fig. 2

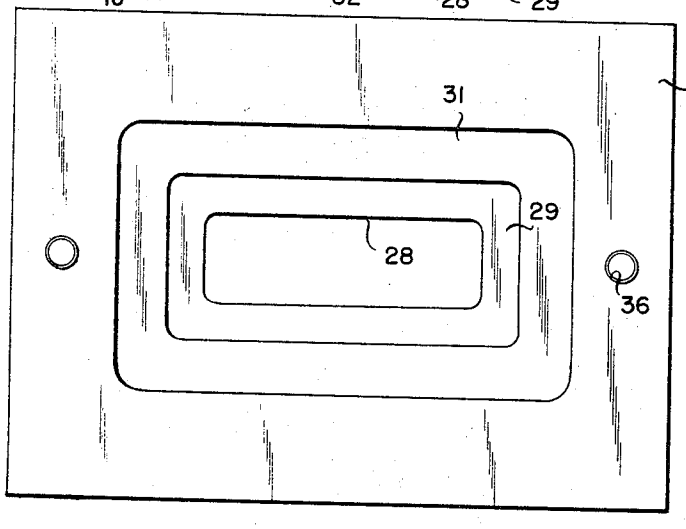

Fig. 3

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3,408,436

METHOD FOR MAKING COMPOSITE DIE

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Filed Mar. 26, 1963, Ser. No. 268,031
4 Claims. (Cl. 264—225)

This invention relates to a method of making dies for the pressing of soap or like relatively soft material into bars, cakes or any desired compact form, and particularly to dies of this type having a specially formed design bearing section, and to methods and apparatus for making the same.

In its preferred embodiment the invention is concerned with a method of making dies for pressing large numbers of small bars of soap of standard size such as the individual cakes supplied in each room by hotels, motels and the like. These establishments have recently required that a name or some other distinct legend or shape be formed on the soap bar to identify the same and as a form of advertising.

Most larger soap pressing dies are formed with internal stainless steel or hard plastic forming surfaces that are smooth and polished except for any intaglio or relief design that may be cut thereinto, which means that a separate die is needed for each soap surface design. This is commercially practical where hundreds of thousands of large soap bars are pressed from the same die day in and day out, but it is not economical or practical to provide a separate permanently inscribed soap die for each hotel or like customer who may order only a few thousand bars of soap but once or at irregular intervals.

It has been proposed for taking care of this trade to provide one or more soap contacting surfaces of the die members with removable and replaceable panels bearing the respective designs, but difficulties have been encountered in making these fit with enough accuracy to avoid undesired marking of the soap bar, and besides the processes of making and changing the die panels are slow and expensive in terms of labor.

The present invention provides a solution for this problem by making composite soap die members containing accurately molded panel inserts in a speedy inexpensive manner.

It is therefore the major object of this invention to provide a method of making a novel soap pressing die structure having one or more accurately formed die surface insert sections, and the novel method of speedily and inexpensively making such die structure.

Another object of the invention is to provide a method of making a novel soap pressing die structure wherein part of the internal soap contacting and forming surface of the die is a specially formed plastic panel for providing a desired design on the pressed soap bar.

A further object of this invention is to provide a novel method of making a soap die member having a soap contacting and forming surface wherein an insert panel or the like is formed as by molding or casting into a recess in said surface, said panel having an exposed surface which except for a design is essentially a continuation of said die pressing surface, and wherein the incorporated panel is removable for molding or casting a substitute panel.

A further object of the invention is to provide a method of making a rigid soap pressing die having a smooth soap contacting surface such as metal formed with a recess, and a design forming insert panel of moldable plastic in said recess.

Another object of the invention is to provide a method of utilizing an apparatus for making a soap die having a molded plastic panel in a recess in its soap contacting and

forming surface wherein the die member is clamped over a master design bearing blank that closes the recess during molding.

Further objects of the invention will appear as the description proceeds in connection with the appended claims and the annexed drawings wherein:

FIGURE 1 is a top plan view of a metal soap pressing die upper member according to a preferred form of the invention;

FIGURE 2 is a section on line 2—2 of FIGURE 1, showing the soap pressing surface recess for receiving the panel;

FIGURE 3 is a section on line 3—3 of FIGURE 2;

FIGURE 4 is a bottom plan view of the soap die member of FIGURE 1 showing the panel recess;

FIGURE 5 is a section similar to FIGURE 2, but showing the insert panel in the recess;

FIGURE 6 is a bottom plan view of the die member of FIGURE 5 showing the panel surface design;

FIGURE 7 is a generally exploded view partly in section showing the parts in position for carrying out the method of the invention;

FIGURE 8 shows the parts of FIGURE 7 in operative assembly and after the plastic material has been introduced to form the insert; and

FIGURE 9 is a top plan view of the jig base showing the master panel recess.

Referring to FIGURES 1–6, the soap die assemblies comprise a die box **10** and associated upper and lower die members **11** and **12**, which are relatively separable vertically for the introduction of a body of soap into the cavity **13** therebetween to pressed and compacted into the shape and size of the cavity.

Preferably the die box and die member arrangements are the same as disclosed in United States Letters Patent to Sweet et al. No. 2,965,946, issued Dec. 27, 1960, to which reference is made for further detail.

Lower die member **12** has recessed therein a smooth soap contacting surface **14**, and upper die member **11** has recessed therein a smooth recessed soap contacting surface **15**.

In the illustrated embodiment, die members **11** and **12** may be hard wear resistant steel blocks usually of stainless steel, and the recessed forming surfaces **14** and **15** are smooth without abrupt corners. The size and shape of cavity **13** are the size and shape of the desired soap bar. The upper die member **11** has a continuous sharp edge **16** around its lower circumference surrounding recess **15**, and lower die member **12** has a similar continuous sharp edge **17** around its upper circumference surrounding recess **14**.

Any conventional arrangements may be used for relative movement of the die members **11** and **12** and introduction of the body of soap therein, such as the arrangements disclosed in said Sweet et al. patent.

As shown in FIGURES 2–4 the metal die member **11** has surface **15** recessed to form a panel mounting recess **18**. This recess is generally rectangular with rounded circumferential corners and having a flat bottom face **19** parallel to the medial portion of die surface **15**. The sides **21** and **22** of recess **18** are preferably flat and intersect face **19** at right angles.

Completely filling recess **18** is a panel **23** of relatively hard plastic material (FIGURES 5 and 6) which has an exposed smooth flat surface **24** at the same level as, and substantially a continuation of, die surface **15**.

Integrally formed on panel surface **24** is a design **25** shown here in relief to project within cavity **13**, and adapted to impress an intaglio design into the compacted soap bar. Alternatively of course the design **25** could be intaglio, or even a combination of intaglio and relief,

with corresponding formation of the compacted soap bar surface.

The panel **23** is secured tightly in place, either by its mode of assembly as will appear, or by separate locking elements as also will appear, or a combination of both.

Should a different design than that at **25** be desired for the soap bar, it is necessary only to displace panel **23** out of recess **18** and replace it with another panel that is identical, except for surface design, and secured sufficiently tightly in place to stay there during die forming of the soap bar.

A preferred method of forming a panel **23** in place on the metal die member will now be described.

The metal die member **11** is formed with three bores **26** leading from the top to open into recess **18**, as shown in FIGURE 2.

Referring now to FIGURES 7–9, the die member of FIGURE 2 is placed in a jig comprising a rigid supporting base **27** formed with a central opening **28** surrounded by an annular recessed shoulder **29**. Stepped at a higher level than the horizontal planar bottom of shoulder **29** is a further annular flat horizontal shoulder **31** having a planar bottom parallel to that of shoulder **29**.

Seated on shoulder **29** is a master blank **32** of hard non-deformable plastic which circumferentially fills the shouldered recess at **29** and projects above it. The flat upper horizontal surface **33** of blank **32** is formed at **34** in reverse intaglio with the design eventually desired to be formed on the panel insert **23**.

Die member **11**, which circumferentially fills shouldered recess **31**, is mounted over the blank **32** with the die surface **15** engaging the upper side of blank **32** and the die is held tightly thereby posts **35** upstanding from holes **36** in the base **27**, clamps **37** extending over its upper end, and nuts **38** tightening down on the clamps on the threaded upper ends of posts **35**. Thus blank **32** is clamped between the die **11** and base **27**.

The entire upper surface of blank **32** is coated with a parting compound, to prevent it sticking to die surface **15** or the molded insert panel to be described.

With the parts so clamped as in FIGURE 8, it will be noted that the rim of the upper flat surface **33** of the blank **32** smoothly and tightly contacts the upper die member surface **15** all around the cavity **18**.

Now a suitable moldable material is poured or injected through the central bore **26** until cavity **18** is at least entirely filled and preferably until the material rises to a certain level in all three bores **26**. As the fluent material enters central bore **26**, air from cavity **18** escapes through the two outer bores **26**. This material of course fills the design inscription **34** on blank surface **33**. As will appear, this material is preferably a synthetic resin or non-metallic plastic that will set, cure or otherwise harden satisfactorily in the cavity **18**.

After the material has hardened within cavity **18** in the jig of FIGURE 8, the nuts **38** and clamps **37** are removed and composite die member **11** simply removed from the jig.

As shown in FIGURE 6, the insert **23** provided by the material is now in place with the design **25** projecting into recess **15**, and the die member is ready for use in soap pressing apparatus as in FIGURE 5. Also as shown in FIGURE 5, the anchoring of panel **23** in place may be assured by providing in one or more outer bores **26** suitable fasteners such as screws **39** that have their threaded ends **41** embedded in the plastic material in the lower part of the bore and their enlarged heads **42** seated in countersinks **43** at the upper ends of the bores.

As above pointed out the die member **11** is usually hard metal or plastic resistant to corrosion by acids in the soaps and by moisture. The illustrated die member **11** is one such as heretofore used for replaceable panels inserted into recess **18**.

The master blank **32** can be an inscribed plate of any suitable material, and I have found it very satisfactory to use a hard tough machineable plastic such as the polymerized methyl methacrylate resin known as Lucite, which is resistant to heat, water and the soap components and may be easily cleanly molded or machined to provide the desired design.

A suitable parting compound such as a silicone wax mold release is coated over surface **33**, dried and polished. Care is taken not to fill the design inscription. This plate must be such as not to deform when the resin curing requires heat.

This parting compound is also spread over the entire surface of recess **18** and the interior of bores **26**, so that when it is desired to replace insert panel **23** by one having a different inscription the entire hardened plastic body may be knocked as a unit out of die **11**.

The material of panel **23** must be one that is capable of being reduced to fluent condition for pouring or injecting into bore **26** and occupying the cavity including the design spaces on plate **32**, and then curing in situ with substantially no shrinkage to preserve surface continuity with the die.

Preferably the panel material is a thermo setting material that exhibits the following properties, although thermoplastic materials may also be used. It must have low viscosity during pouring to allow the escape of air bubbles. It must have minimum shrinkage during curing or otherwise hardening, preferably a maximum of 1 to 2 percent and certainly well under 5 percent. It must not expand appreciably during hardening, to avoid cracking the die member or undesired distortion. The heat required for hardening should be well below the heat distortion temperature of the die member or plate **32**. In fact it is preferable to provide a resin which will harden within a reasonable time at room temperature.

The preferred panel material is a thermo setting resin such as one of the epoxy resins. One of these epoxy resins found quite satisfactory is that known as Shell Epon 815, and its viscosity is suitably adjusted by introduction of a diluent such as a suitable glycerol based resin. While this resin will attain a suitable hardened condition at room temperature. I have been able to accelerate hardening somewhat by overnight storage in a 120° F. oven. It must be appreciated that higher temperatures of hardening may introduce unwanted stresses due to differences in thermal expansion of the die member and the insert **23**.

The fasteners **39** which are used in each of bores **24** and **25** are inserted while the resin is still plastic, and when the resin hardens the assembly is locked together permanently.

The foregonig provides an improved method of incorporating insert panels in soap die members which is not only speedy and inexpensive but results in a superior die member wherein the cast insert surface **24** is a substantially smooth continuation of die surface **25**. This insert may be speedily and efficiently replaced by another simply by knocking out the hardened insert panel and incorporating a new one by the method described above.

The invention may be embodied in other specific forms without departing from the spirit or essential characteristics therefor. The present embodiments are therefore to be considered in all respects as illustrative and not restrictive, the scope of the invention being indicated by the appended claims rather than by the foregoing description, and all changes which come within the meaning and range of equivalency of the claims are therefore intended to be embraced therein.

What is claimed and desired to be secured by Letters Patent is:

1. A method of producing a composite die part having a design panel insert in a recess in the forming surface of a metal die member and being adapted for the pressing of soap or like relatively soft material into a desired solid compact form which comprises the steps of mounting said die member having a plurality of bores leading from the top of said member to said recess in a fixture wherein

said recess is closed by a rigid blank that has its inner face extending across said recess substantially continuous with said die forming surface of the die member and formed with the desired design in reverse facing into said recess, introducing a fluent moldable synthetic resin plastic material through a bore in said die member to at least fill said closed recess, allowing said material to harden in said recess and removing the completed composite die part having the molded panel insert fixedly incorporated therein from said fixture, said insert surface being a substantial continuation of said die member forming surface.

2. A method of producing a composite die part having a design bearing plastic panel insert in a recess in the forming surface of a rigid metal die member and being adapted for the pressing of soap or like relatively soft material into a desired solid compact form which comprises the steps of mounting said die member having a plurality of bores leading from the top of said member to said recess in a fixture wherein said recess is closed by a relatively rigid blank of non-metallic plastic that is resistant to deformation when heated and has its inner face extending across said recess substantially continuous with said die forming surface of said die member and formed with the desired design in reverse facing into said recess, introducing thermosetting synthetic resin material through a bore in said die member to at least fill said recess, allowing said material to harden in said recess and separating the completed composite die part having the molded panel insert fixedly incorporated therein from said fixture and said blank, said insert surface being a substantially smooth continuation of the die member forming surface.

3. A method in accordance with claim 2 wherein said die member is provided with a parting compound between coextensive contacting surfaces of said die member and said plastic blank.

4. A method of producing a composite die part having a design bearing plastic panel insert in a recess in the

forming surface of a rigid die member and being adapted for the pressing of soap or like relatively soft material into a desired solid compact form which comprises the steps of mounting said die member having a plurality of bores leading from the top of said member to said recess in a fixture wherein said recess is closed by a rigid blank that has its inner face extending across said recess substantially continuous with said die surface and formed with the desired design in reverse facing into said recess, pouring fluent moldable synthetic resin plastic material through a bore in said die member to at least fill said recess, introducing a fastener into one of said bores to be partially embedded in said material and interlocked with said die member, allowing said material to harden and separating the completed composite die part having the locked molded panel insert fixedly incorporated therein from said fixture and said blank, said insert surface being a substantially smooth continuation of the die member forming surface.

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