Aug. 26, 1958 M. PETTY 2,848,774

SECTIONAL MOLDS

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Fig. 1

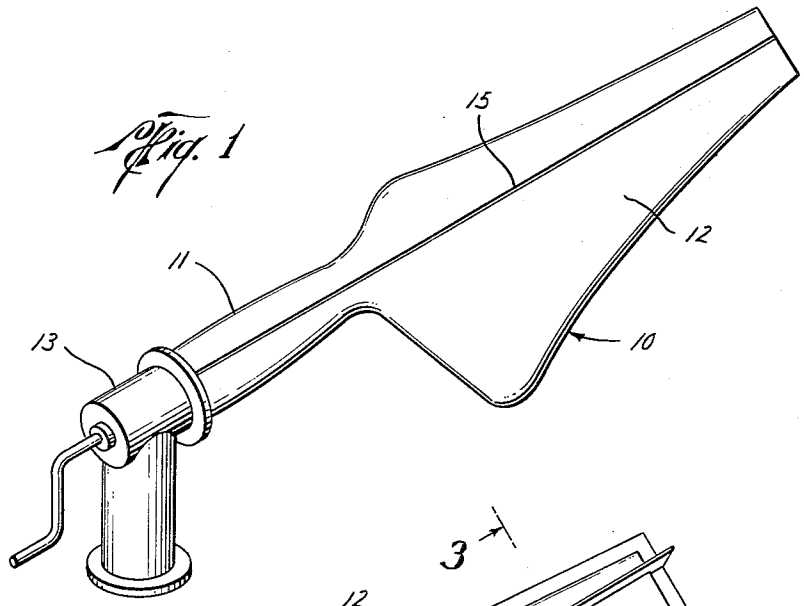


Fig. 2

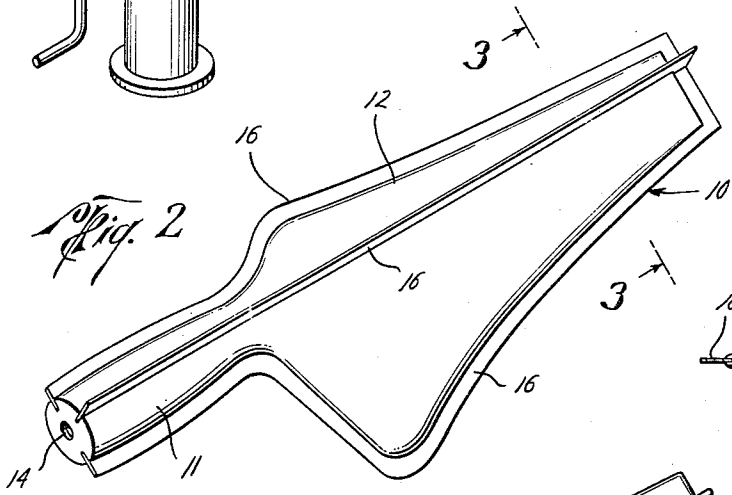


Fig. 3

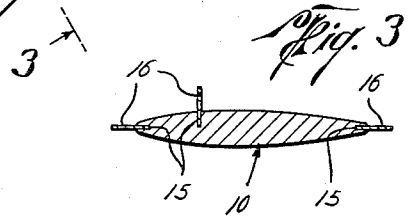
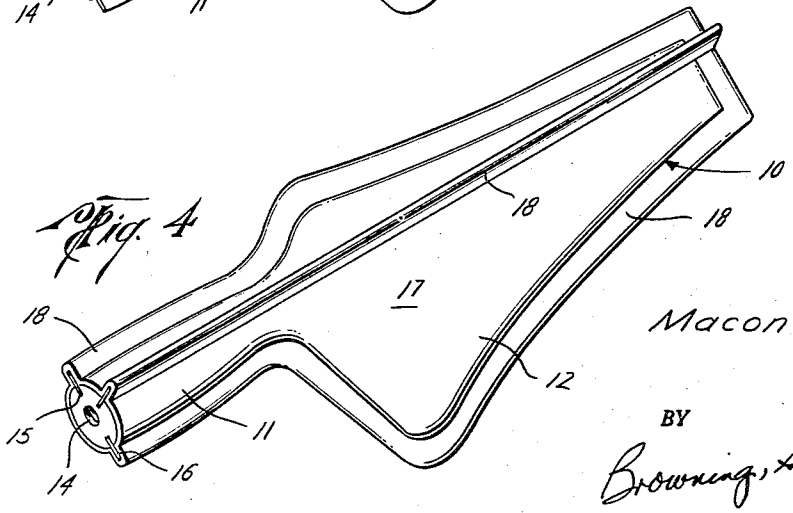


Fig. 4



Macon Petty
INVENTOR.

BY
Browning, Simms & Hyer
ATTORNEYS

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Fig. 6

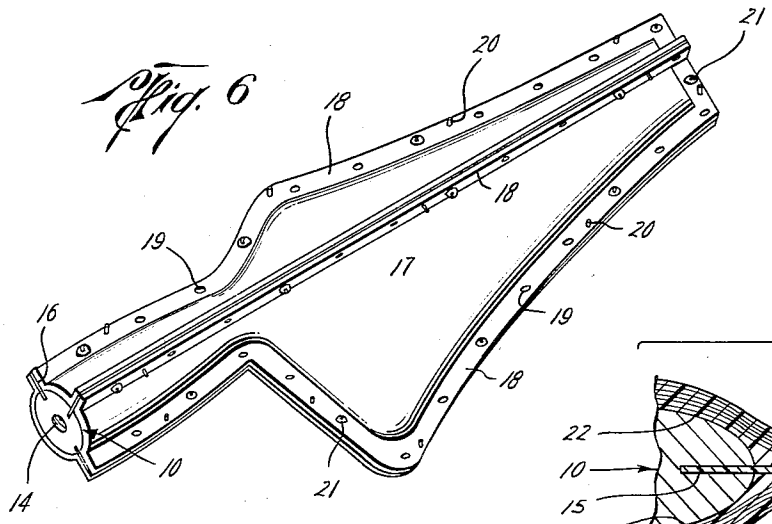


Fig. 5

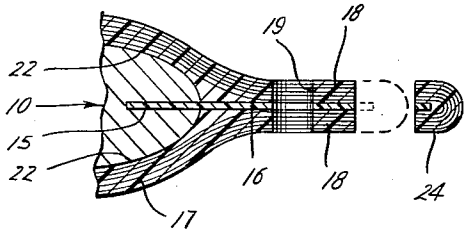
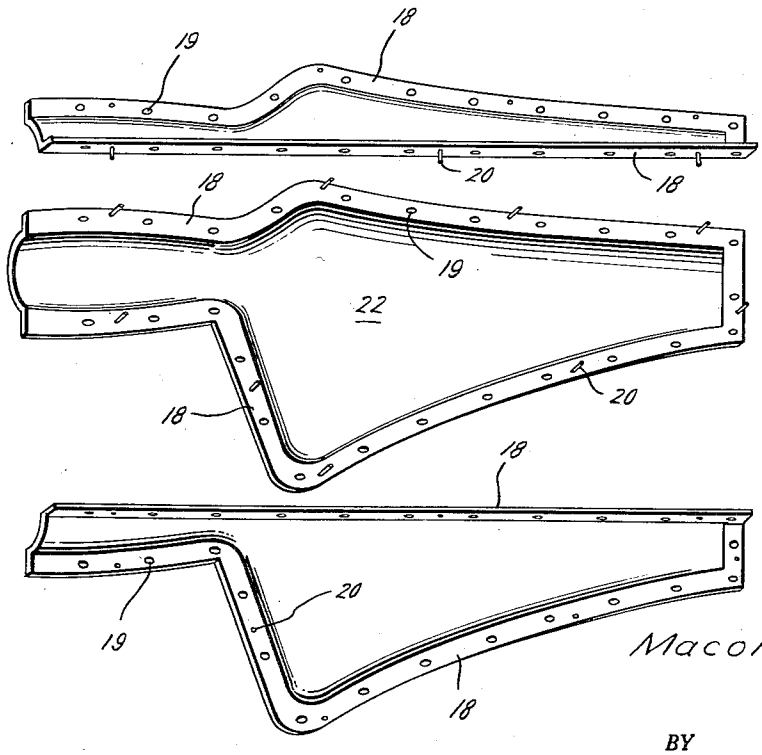


Fig. 7



Macon Petty
INVENTOR.

BY

Browning, Simmons & Hyer
ATTORNEYS

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SECTIONAL MOLDS

Macon Petty, Houston, Tex., assignor to Hudson Engineering Corporation, Houston, Tex., a corporation of Texas

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4 Claims. (Cl. 22—193)

This invention relates to a method of making sectional female molds and, more particularly, to a novel method of making such molds in which parts for aligning the sections thereof upon assembly may be formed in such sections during fabrication of the mold.

It is customary to produce shaped bodies within a female mold having sections adapted to be assembled and secured together to form a cavity or inner surface for enclosing a settable material from which the bodies are to be formed. Thus, upon hardening of the material and separation of the mold sections, the shaped body may be removed intact.

The inner surface of the mold is formed upon a model or prototype of the body to be shaped. In the forming of bodies having very small tolerances, extreme caution is exerted to insure that inner surfaces or cavities of the mold sections are matched or properly aligned upon assembly. For this purpose, each mold section may be provided with a part or parts for alignment with an adjacent section.

An object of this invention is to provide such a method which permits the formation of aligning parts on the mold sections with a minimum of effort and an assurance that such parts will serve to accurately align such parts.

Another object is to provide a method of making sectional molds which necessitates no special equipment and particularly which does not require the use of apparatus for containing the mold material about the model or prototype.

Other and further objects of this invention will appear as the description proceeds.

In the accompanying drawings forming a part of the instant specification and wherein like reference numerals are used in the various views to indicate like parts:

Fig. 1 is a perspective view of the model with narrow grooves formed therein and mounted upon a rotatable support;

Fig. 2 is a perspective view of the model with thin parting strips inserted within the narrow grooves;

Fig. 3 is an enlarged sectional view of the model taken substantially along broken line 3—3 of Fig. 2;

Fig. 4 is a perspective view of the model covered with a settable mold material;

Fig. 5 is an enlarged sectional view of flanges of the mold section formed upon opposite sides of the parting string, with an aligned opening formed therethrough and an outer end thereof removed;

Fig. 6 is a perspective view of the mold sections upon the model just prior to separation and removal therefrom; and

Fig. 7 is an exploded view of the separated mold sections removed from the model.

According to the present invention, a narrow groove is formed in the model of the body along a desired line of separation between the mold sections, and a thin parting strip is inserted securely within the groove with an edge thereof projecting outwardly from the model. The model is covered first with a suitable parting agent

and then a settable mold material. Such material is actually applied over the outer end of the projecting edge of the parting strip so as to form interconnected flanges upon opposite sides thereof.

With the model so covered with the mold material, aligned openings are formed through the flanges at each side of the parting strip, and the outer portions of such flanges are removed along a line inwardly of the outer end of the projecting edge of the parting strip but outwardly of the aligned openings. Upon separation of the mold sections and removal form the model, the aligned openings through the flanges serve not only to accurately align the mold sections upon assembly thereof, but also to receive bolts or other means for securing the sections together.

Fan blades are exemplary of that type of body which requires a very small tolerance in its formation. For this reason, the method of the present invention has been illustrated in connection with the making of a mold for a body having the shape of such a blade, although it will be understood that the novel concepts of the invention are not so limited.

Turning now particularly to the drawings, there is shown a model or prototype **10** of a fan blade or similarly shaped body having a restricted neck portion **11** and a relatively wide but tapering chord **12**. As is known in the art, this model may be formed of any suitable material such as plaster, wood, plastic, etc., with its outer surface smoothed or polished to a high degree. For ease in handling, and especially for permitting ready access to opposite sides thereof, large and heavy models may be secured to a support **13** for rotating same about a horizontal axis. As shown in Fig. 2, the end of the neck **11** of the model may be provided with a threaded opening **14** for connection axially of the support.

As shown in Fig. 1, the model **10** has a narrow longitudinal groove **15** formed upon one side thereof intermediate the leading and trailing edges of the chord **12** and, as indicated in Fig. 2, another such groove formed longitudinally along such edges and across the outer tip of the model. These grooves define the desired lines of division or separation between the mold sections to be formed and are thus located with this in mind. In the particular application shown, the grooves are not continuous as it is contemplated that the finished mold will have an open end through which the material for forming a particular blade may be applied. Further, in this particular embodiment, the mold is to be formed of three sections. It will be understood, however, that the method to be described is applicable to models having any variety of shapes wherein the grooves may be continuous about the model and the sections may number more or less than the three illustrated.

The parting strips **16** are thin to permit insertion within the grooves **15** and subsequent securement as by gluing. For this purpose, flexible strips of cellulose acetate sheeting or thin gauge metal such as shim stock may be used as the present method does not require that each strip be rigid or necessarily coplanar when covered with the mold material. The strips are of a width to project outwardly a distance sufficient to accommodate aligned openings therethrough, in a manner to be described.

The mold may be made of any suitable material which will set up and harden when applied as a coating **17** (Fig. 4) to the model. For example, the mold material may comprise metal sprayed over the model and parting strips. The model may also be covered with polyester or epoxy resin reinforced with laminations of fiber glass, as indicated in Fig. 5, which may be laid up upon one side of the model and then the other by hand. Prior to application of the mold material, however, the model may be prepared with any suitable parting agent, such as a vinyl

type applied over a wax coating on the model, to permit easy removal of the finished mold sections therefrom. It has been found also that an acetate parting strip will naturally separate from polyester resin.

From Fig. 4, and more particularly from Fig. 5, it can be seen that the model and the projecting edges of the parting strips including the outer ends thereof are covered with the mold material to form flanges 18 for adjacent sections on opposite sides of the projecting edge of the parting strip 16 which are interconnected by portions 24 (shown removed in Fig. 5).

In this manner, the mold sections are accurately disposed upon the model as an aligning part in the form of an opening 19 is formed through such flanges of the hardened material and the projecting edge of the strip prior to separation of the sections from one another and removal from the model. These openings may later accommodate dowel pins 20 or securing members such as bolts 21, as shown in Fig. 6, such that after separation the mold sections may be assembled and secured with the inner surface or cavities 22 thereof in accurate alignment.

After the aligned openings have been formed, the mold material portions 24 are removed, as shown in Fig. 5, by cutting of the flanges along a line outwardly of the openings 19 but inwardly of the outer end of the projecting edges of the parting strips. With the flanges of adjacent mold sections thus disconnected, they may be easily separated along the parting strips and removed from the mold, as shown in Fig. 7.

It will be noted that while in the illustrated method, mold material covers the outer ends of the projecting edges of the parting strips along their entire length, this is not necessary to the practice of the invention as long as such edges are so covered as to securely interconnect the mold sections during formation of the aligned openings 19.

From the foregoing it will be seen that this invention is one well adapted to attain all of the ends and objects hereinabove set forth, together with other advantages which are obvious and which are inherent to the method.

It will be understood that certain features and subcombinations are of utility and may be employed without reference to other features and subcombinations. This is contemplated by and is within the scope of the claims.

As many possible embodiments may be made of the invention without departing from the scope thereof, it is to be understood that all matter herein set forth or shown in the accompanying drawings is to be interpreted as illustrative and not in a limiting sense.

The invention having been described, what is claimed is:

1. In the method of making a sectional female mold for a shaped body, the steps of forming a narrow groove in a model of the body at the desired line of division between sections of the mold, inserting a thin parting strip within the groove with an edge of said strip projecting freely from the model, and covering the model and the projecting edge of the parting strip including the outer end thereof with a settable mold material to form mold sections which are interconnected to one another by adjacent flanges, and forming aligning parts in adjacent flanges prior to separation of the interconnected mold sections.

2. In the method of making a sectional female mold for a shaped body, the steps of forming a narrow groove in a model of the body along the desired line of separation between sections of the mold, inserting a thin parting strip within the groove with an edge of such strip projecting outwardly from the model, covering the model and the projecting edge of the parting strip including the outer end thereof with a settable mold material to form mold sections which are interconnected to one another by adjacent flanges, forming openings through the adjacent flanges and removing the outer portion of said flanges inwardly of the outer end of said edge but outwardly of said openings, whereby the mold sections may be separated along the parting strip therebetween.

3. In the method of making a sectional female mold for a shaped body, the steps of providing a model of the body with a thin parting strip projecting outwardly therefrom along the desired line of separation between sections of the mold, covering the model and the projecting edge of the parting strip including the outer end thereof with a settable mold material to form mold sections which are interconnected to one another by adjacent flanges, and forming aligning parts in said adjacent flanges prior to disconnection and separation of the mold sections from one another.

4. In the method of making a sectional female mold for a shaped body, the steps of providing a model of the body with a thin parting strip projecting freely therefrom along the desired line of separation between sections of the mold, covering the model and the projecting edge of the parting strip with a settable mold material to form mold sections which are interconnected to one another by adjacent flanges on the opposite sides of said edge, forming aligning parts through the adjacent flanges, and then separating the interconnected mold sections.

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