April 11, 1967 C. PRIESMEYER ETAL 3,313,231

EMBOSSING SEAL PRESS

Filed June 29, 1965 3 Sheets-Sheet 1

FIG 1

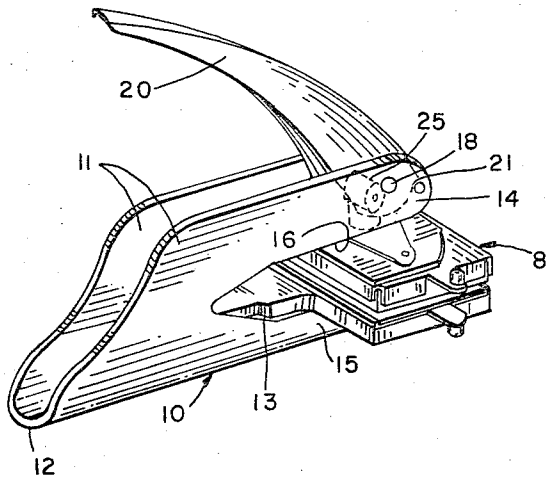
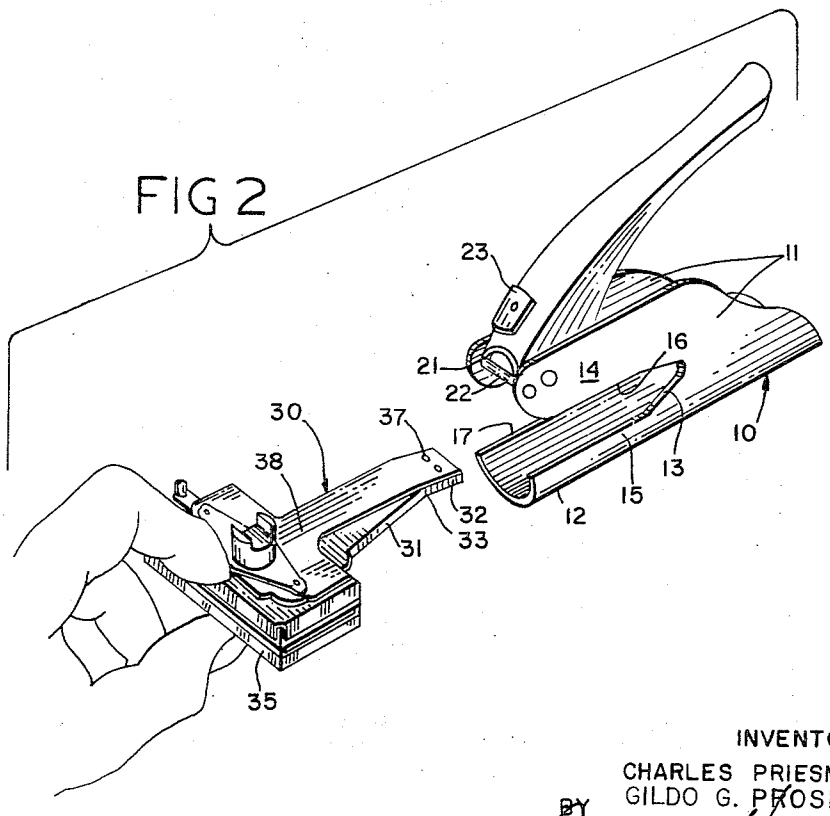


FIG 2



INVENTORS
CHARLES PRIESMEYER
GILDO G. PROSEN
BY
ATT'Y

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FIG 3

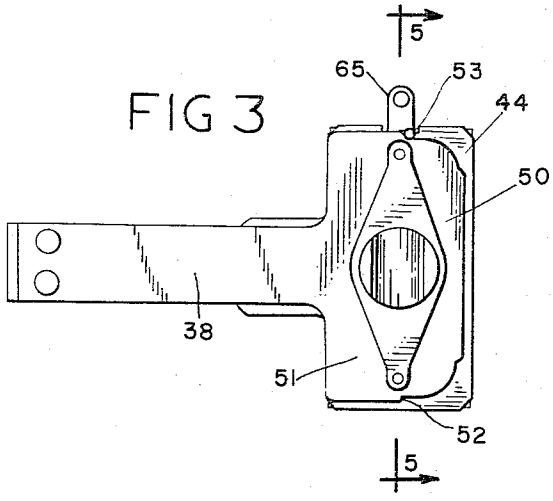


FIG 4

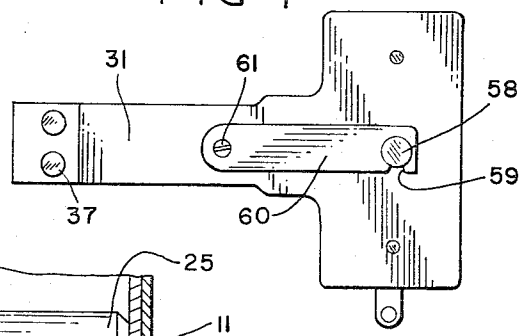
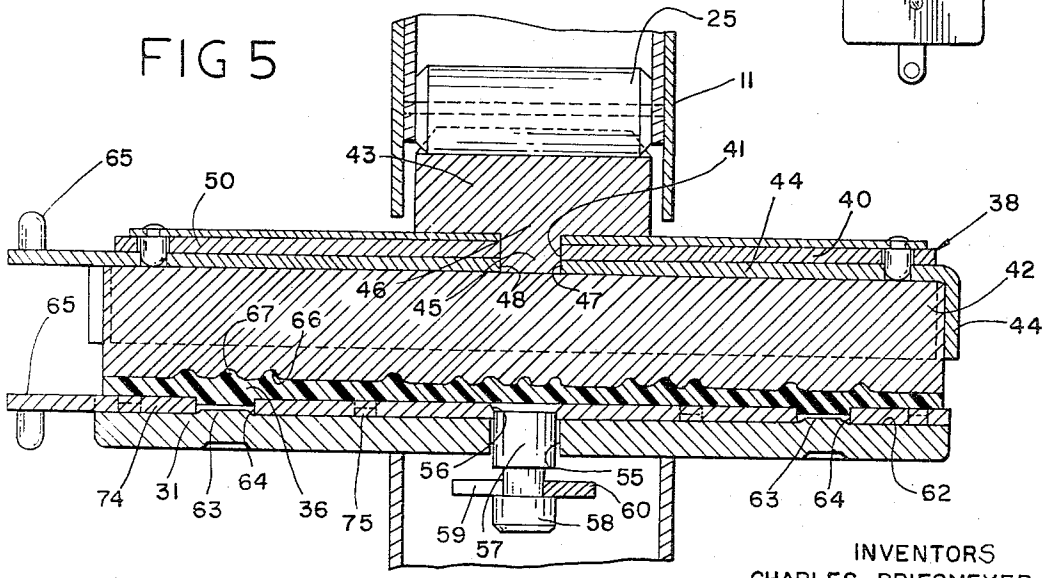


FIG 5



INVENTORS
CHARLES PRIESMEYER
GILDO G. PROSEN

BY Watson D. Harbaugh

ATT'Y

April 11, 1967 C. PRIESMEYER ETAL 3,313,231

EMBOSSING SEAL PRESS

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FIG 6

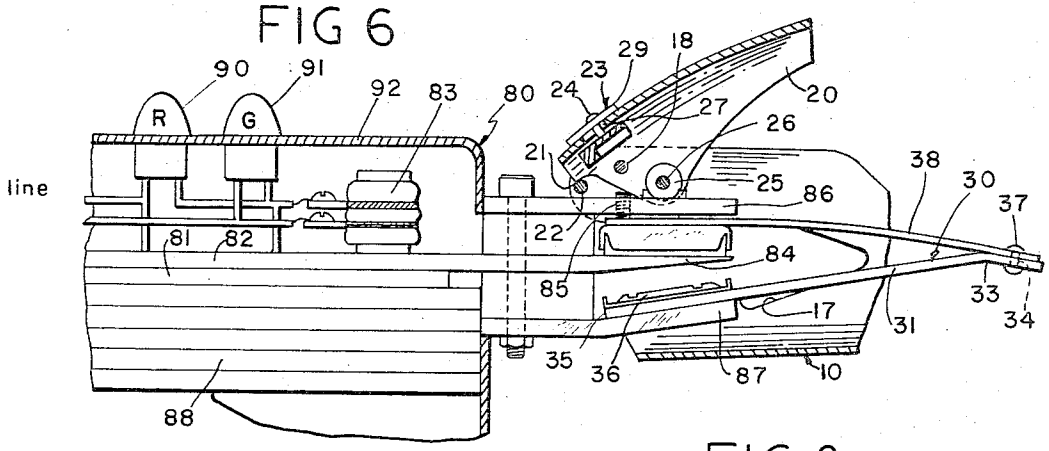


FIG 8

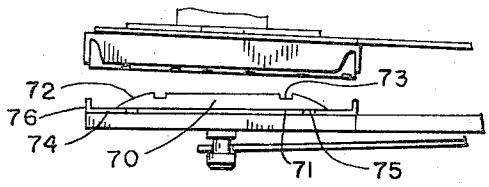


FIG 7

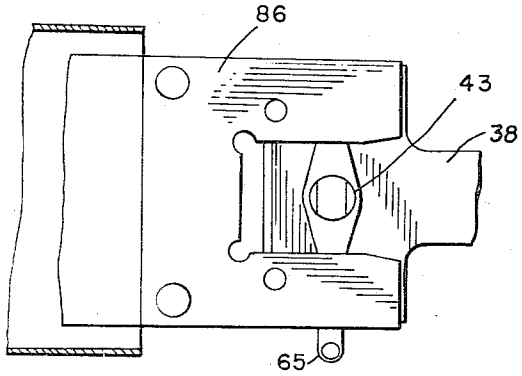


FIG 9

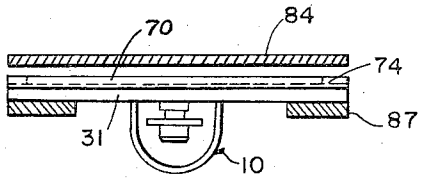


FIG 10

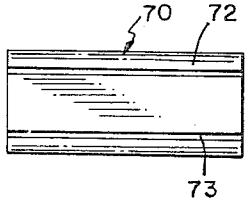
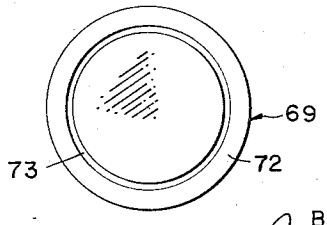


FIG 11



INVENTORS
CHARLES PRIESMEYER
BY GILDO G. PROSEN
Gaston D. Haubaugh
ATT'Y

United States Patent Office 3,313,231 Patented Apr. 11, 1967

3,313,231

EMBOSSING SEAL PRESS

Charles Priesmeyer, Park Ridge, and Gildo G. Prosen, Chicago, Ill., assignors to Meyer & Wenthe, Inc., Chicago, Ill., a corporation of Illinois

Filed June 29, 1965, Ser. No. 467,848
11 Claims. (Cl. 101—3)

The present invention relates to seal presses and dies for embossing notary public, corporate and personal ad- to the simultaneous forming and mating of the male die from a matrix die in the seal press itself in their actual working positions for perfect registration.

To avoid confusion of terminology, the die first made will be referred to as the matrix die because it generally is female in its characteristics and the counter die formed therefrom in accordance with the invention will be referred to herein as the male die. Either can have intaglio or relief indicia as contemplated by the invention.

In seal presses of the type under consideration, it is the accepted practice to letter a matrix die blank by engraving or stamping intaglio indicia in the face of a matrix blank made of brass, use it directly as a matrix to make the male die and then mount and operate the two dies in a cooperating relation in a press frame such as shown in the Priesmeyer Patents Nos. 2,998,766 and 3,177,801 which are hereby incorporated herein by reference.

Heretofore, this process has taken much more time than customers are willing to spend waiting for delivery. Accordingly, it has been the desire in the seal press industry for a long time to provide local jewelers and stationers with equipment that enables them to accept an order for a personalized embossing seal, and within minutes make and deliver it, across their own counters, to the customer, while the customer orders and waits for it, and, likewise, if need be, to service it with equal promptness while the customer waits.

With regard to lettering matrix dies, low price engraving machines are available that are capable of lettering matrix dies with excellent results. A great many shopkeepers already use them for other and general engraving purposes. More shopkeepers would own such machines if they had a wider use for them. For other shopkeepers hand stamp die alphabet sets can be kept on hand for use in completing partially prelettered die blanks such as shown in the Priesmeyer Patent No. 2,906,-197 and co-pending application Ser. No. 99,871.

Referring now to the forming of the male die, several principle methods have been employed heretofore to form the male die from the brass matrix die. One involves the forging of an aluminum blank against the face of the matrix die with repeated blows in a high tonnage press.

A second is the melting of a low melting-point casting metal and splash-forming the die as shown in an earlier Priesmeyer Patent No. 2,909,817. A third method is to prepare male dies from a thermosetting material such as the phenolic known by the trade mark "Bakelite," with or without reinforcing fibers therein.

Striking an aluminum male die involves heavy equipment, generally supported on a heavy concrete foundation, and requires skilled labor with ample production volume in order for the fabrication to be acceptable and profitable. In driving the aluminum metal into the matrix indicia, large portions of the metal at the driven face are laterally displaced by the repeated blows and such also distorts the matrix. Thereafter, the counter die has to be trimmed, all distortion corrected for with care, and the male die mounted in its proper place and orientation in the seal press frame with permanent type adhesive. All of this not only takes a great deal of careful work and time, but a day or two generally elapses in excursion

shipping before the customer ultimately receives the product he probably wanted right away.

Splashing molten metal against a matrix has proven to be a time saving process for merchants where a heavy press is not readily available geographically and provides excellent embossments when proper temperatures are maintained. However, trimming the counter die and mounting it requires skill and time and also the use of adhesives and it is difficult to set the dies exactly correctly. Also it is difficult to make quick delivery.

Making male dies of phenolics requires mold cavities for a loose or doughy material, relative high mold pressures, heat, curing time, and a trimming and mounting with the use of adhesives and the accompanying difficulties of exactly setting the dies. Moreover, unless reinforcing fibers are used, the counter die can crack in use; and, whether reinforced or not, requires at least twice the thickness of other counter dies mentioned plus the adhesive means. These thicknesses reduce the throat opening between the die and counter die, and with most manually operated seal press frames, adjustments and other corrections are required in order for the dies to match and close acceptably on the paper they emboss. Furthermore, in event a male die is a "reject" as defective, a completely new one has to be made.

One of the objects of the present invention is to provide an improved construction and process by which a male die can be made, mounted perfectly in the seal press and the seal press delivered to the customer complete for immediate use within minutes after the matrix die has been made.

Other objects contemplate that the opening spread of the dies remain the same or can even be slightly increased to better receive folded legal papers quite easily therebetween; the counter die is impervious to chemical cleaners upon the market; will have a long use without show of wear; can be easily repaired or replaced within minutes if damaged; will not crack or chip under expected use; can be used with seal presses already in existence as well as with improved ones built specifically for the invention; and, can be molded with only the manual pressure upon the seal press handle normally used in making a paper embossment.

Other objects of the invention reside in the novel relationship of parts which are easily made, assembled and repaired by merchants in across-the-counter sales, and, which are readily interchangeable and ruggedly constructed for long and satisfactory operation.

These being among the objects of the invention, other objects and advantages will become apparent as the description continues in connection with accompanying drawings in which:

FIG. 1 is a perspective view of a manually actuated seal press constructed in accordance with the present invention with the handle in raised position,

FIG. 2 is a perspective exploded view illustrating the assembly and disassembly of the two component units making up the seal press as shown in FIG. 1,

FIG. 3 is a plan view of the die carrier component embodying the invention,

FIG. 4 is a bottom view of the die carrier shown in FIG. 3,

FIG. 5 is an enlarged cross-sectional view taken along the line 5—5 in FIG. 3 and including the seal press elements immediately associated therewith retaining the die carrier in the closed position,

FIG. 6 is a side elevational view of a heating device associated with the die carrier employed as part of the process embodying the invention,

FIG. 7 is a top plan view of the heating relationship shown in FIG. 6,

FIG. 8 is a side elevation of the die carrier in partially

open position as withdrawn from the heater ready for application of embossing pressure which forms the male die as shown in FIG. 5,

FIG. 9 is an end view partly in section showing the male die blank in the position shown in FIG. 8, and

FIGS. 10 and 11 are plan views of male blanks of different shapes for a square and round die forms, respectively.

The invention in its preferred and portable embodiment contemplates a unitary die assembly of personalized embossing dies which are matrix formed and used under paper embossing pressures in a manually powered seal press frame.

The press frame **10** disclosed comprises a flat stamping of heavy sheet metal that is die formed to the U-shaped cross-section shown wherein the upright sides **11** are parallel. The external convex surface of the rounded bottom portion of the U-section provides a handle **12**. At their front end, the sides **11** are notched out as at **13** to provide compositely an overhanging arm **14** and a lower arm **15** whose facing edges **16** and **17**, respectively, define a throat between them. The two sides of the overhanging arm **14** are riveted together (FIG. 6) by a rigidifying spacer rivet **18** and a lever handle **20**, also of a U-shaped stamping, is pivotally mounted thereon and has notches at **21** which provide stop shoulders that engage a second rivet **22** to limit upward movement of the handle. As shown, (FIG. 6) the handle **20** has a latch **23** slidably mounted at its forward end comprising upper and lower members **29** held in place by a rivet **24** slidable in a slot **27**. Whenever the handle is pressed downwardly, a predetermined distance, the latch **23** can be slid forwardly to ride over the top of the rivet **22** to prevent separation of the dies. This latch serves many purposes in the invention. It not only holds the handle collapsed for storage and the dies closed against contamination, but it is utilized to lock the dies under molding pressure during the matrix forming of the male die as will be further discussed later.

Between the sides of the handle **20**, the handle carries at its front end a roller **25** journalled on a transversely disposed pin **26**. The location of the roller geometrically is such that in its resting position, it is to the rear and above the rivet **18** so that downward movement of the handle **20** drives the roller accurately downwardly with a "type 2" lever action of substantial power to develop paper embossing pressure between the dies.

The unitary die assembly **30** is received between the roller **25** and the edge **17** (FIG. 2) and comprises a lower die support **31** stamped from heavy brass plate stock to provide the inner portion **32** with parallel sides and is preferably bent at **33** and perforated (FIG. 6) to provide rivet holes at **34**. The front end is shaped at **35** to the contour of the bottom die **36** to support it and it, in turn, rests upon the edges **17** for that purpose. Riveted to the rear end **33** as by rivets **37** is a substantially flat spring blade **38** whose front end **40** is perforated as at **41** to provide a means for supporting the upper die **42**.

The front end **40** has a saddle member **43** thereon engaging the roller **25** in interengaging relationship as guided between the frame sides **11** throughout their working movement and urged to maintain such engagement under the die opening effort of the spring **38**. The die assembly is supported against turning in the frame by the spring **38** and arm **32** extending far enough to be disposed between the side walls **11** at all times. Except for the interengagement between the saddle and the roller, the unitary assembly is free to move in the press frame and rests in supported relation on the bottom edge **17** opposite to the roller so that a single frame **10** can receive any one of a number of die assembly units of various sizes and shapes in proper working position interchangeably as held solely by the interengaging relationship described.

The upper die arrangement includes a die receiving cup **44** (FIG. 5) in which the upper die element **42** is pressed.

Although this cup can be rigidly mounted on the spring blade at the perforation **41**, it is preferred to mount same rotatably as shown. In doing this, the lower end or shaft portion **45** of a shank **46** on the saddle member **43** is of reduced cross-section and is snugly received non-rotatively within the opening **41** and loosely in the opening **47**. The lower marginal extremity **48** of the shank **46** is peened over to provide a bearing surface about which cup **44**, and hence die unit **42** is rotatable on the axis defined by shank **46**. Otherwise, if the upper die is to be non-rotatable, the openings **41** and **47** are press-fit on shank **45** with the shank **45** also rigidly secured to spring **38**.

The forward portion **50** (FIG. 3) of the spring **38** is enlarged laterally to form a plate **51**, having an external contour defining a pair of oppositely spaced shoulders **52**. Projecting upwardly from and secured to the cup **44** is a stop **53** disposed to move in a circular path encountering shoulders **52**. Thus, upon rotation of the die unit **42** about the axis defined by shank **46**, shoulders **54** define limits to the die movement.

The lower die arrangement includes the die support **31** (FIG. 5) to which is secured the lower die **36**. Centrally disposed in the support **31** and the enlarged front end portion **40** of the lower die support **31** are respective openings **55** and **56**. A shaft **57** is received slidably through opening **55** but tightly within opening **56**, the innermost end portion of shaft **57** being peened over against a counter bore of opening **56** to rigidly secure the shaft to lower die unit **31**. Shaft **57** thus defines an axis about which the lower die is rotatable.

Pressing against the inner surface of an enlarged head **58** on the lower end of shaft **57** (FIGS. 4 and 5) is one end of a leaf spring **60**, the other end of which is secured by a screw or rivet **61** to the underside of lower die support **31**. Spring **60** urges the back side **62** of lower die unit **36** and die support **31** into engagement and, if riveted at **61**, the spring **60** is laterally notched at **59** for lateral movement from beneath the head **58** to release the shaft **57**.

Projecting upwardly from die support **31** are a plurality of detent raised areas **63** (FIG. 5). Corresponding areas relieved as by holes **64** are formed in support **31** on the back side of lower die **36** facing the surface of lower die support **31** and engaging the raised areas **63**. Upon rotation of lower die unit **36**, holes **64** move in a circular path successively encountering raised areas **63**. Thus, the walls of holes **64** constitute stops successively detetentingly engageable with shoulders defined by raised areas **63** upon coincident positioning thereof.

To mount the die assembly **30** within frame **10**, the forward ends of the die units **36** and **40** are finger pressed toward each other, and the assembly **30** is slipped longitudinally into the notch **13** and between side walls **11**. The handle **20** is free to move upwardly and permit this insertion and upon release of the finger pressure, the saddle **43** engages roller **25** and forces the handle **20** into an upward, rest position. Removal of unitary assembly **30** is easily accomplished by inverting the seal press and again finger pressing the dies together for withdrawing the assembly outwardly. Roller **25** has sufficient idling motion to permit it to clear the roller **25** with the handle moving to its "open" position under gravity.

As illustrated (FIG. 5), upper die **42** includes on its die face a series of intaglio characters **66** referred to sometimes as matrix lettering. Mateable therewith on the upwardly facing die face of lower die **36** are a corresponding series of die characters **67** in relief sometimes referred to as male lettering. In order to insure a proper mating relationship of the die characters **66** and **67**, the assembly **30**, includes indicating tabs **65** fixed to the dies which individually and together depict the relative rotational position therebetween for assured determination of the mateable orientation. To this end, the tabs **65** project laterally from cup **44** and plate **31**, respectively. With proper orientation of the die characters, tabs **65** are

aligned one above the other. However, should one die be located at a position improper with respect to the other, an immediate visual indication is afforded to the user by the appearance of tabs projecting more than one way from the assembly.

The die **51** is made of reasonably hard brass to the general shape of the impression expected and is made either with or without a sintered metal core for ink. The matrix characters are made therein by engraving or stamping with their upper extremities opening into the sintered metal case, if present.

The male die **36** is preferably formed from extruded stock of cellulose acetate and cut to a size that forms a blank **70** preferably of the sectional configuration shown in FIG. 10 or 11 and approximately .050" thick, having a flat bottom **71** and beveled top side edges **72** with stock relief grooves **73** close to each side. Although the blank can be cut from biaxially oriented sheet stock, the same compressive and tensile strengths are present with extruded strip stock which is sheet-like in form, as long as a set of specifications and dimensions are maintained constant for uniformity of results.

The circular blanks **69** for circular male dies are formed from sheet stock and preferably have a like flow control groove **73** around the periphery just inside the edge as shown in FIG. 11. The flow control grooves border the area where indicia will appear and permits a uniformity of flow over this area without opposition to that flow from flow induced in adjacent areas while the male die is being formed.

A male die carrier **74** is a part of the die element **36** and is made of sheet metal having upwardly bent marginal flanges **76** of a depth of approximately one half the thickness of the blank **70** and the inside dimension is slightly in excess of the corresponding dimension of the matrix die **42** with the floor of the carrier apertured at **75** to provide locking means and plastic flow space for the stock of the male die in the areas adjacent to the indicia area.

The method of forming the counter die includes sinking the indicia in the matrix die **42** and locating the matrix die in the upper carrier or die cup **44** in its ultimate working position. The blank **70** is then placed on the floor of the carrier **74** with the seal press dies wide open. Heat is then applied by direct metal to metal heat exchange contact with the face of the matrix die **42** until the temperature thereof is brought to 425° F. While this is occurring, heat is radiated downwardly through a limited air space to the upper surface of the blank **70** to warm the upper surface thereof to a temperature just below its soft-flow point or plastic memory recovery level. Simultaneously therewith, heat is also applied by metal-to-metal contact with the lower die support **31** at spaced points to bring it to a temperature of approximately 425° F. with some of the heat transferred to the die carrier **74** to bring it to a level below the softening point of the blank **70**. When these temperatures are attained, the seal press handle **12** is squeezed down and locked in closed position by the latch **23**. Molding heat flows from the matrix die **42** into the upper portion of the plastic blank **70** and the plastic flows into the letters on the matrix die, also softens the substrate plastic enough to flow it with continuity across the face of the matrix die and against the flanges **76** where it is blocked by close clearances between the edges of the matrix die and the flanges **76**.

During this application of heat and the flow of plastic, the heat is rapidly transferred from the lower die support to the bottom of the carrier **74** through metal-to-metal heat exchange contact, established when the handle was squeezed and locked, whereupon additional heat is rapidly applied under pressure to soften the bottom of the blank. Then when the lateral flow on the upper face is blocked by the flanges **76**, the continued pressure will flow the further heated plastic on the bottom face into the apertures **75** and form interlocks therewith to secure the counter die permanently in place and in solidly mating

relationship with the contour of the carrier bottom in proper registration with the matrix die.

Referring now to FIG. 6 this forming of the male die **36** is accomplished by a heating device **80** which includes a heating element unit **81**, a heat transfer core **82** of copper, a normally closed thermostat **83** and three vertically spaced copper shelves **84**, **85** and **87** carried by the core and plated to prevent heat discoloration. The core is weight supported on asbestos blocks **88** and enclosed in a protective housing **92**. Suitable signalling devices represented by alternately operated Red and Green lights **90** and **91** respectively, indicate when the heater is on and ready for use. The Red light goes "on" when the thermostat is closed and the Green light, shunted by the thermostat, goes "on" when the thermostat opens to indicate that the heater is ready for a work cycle.

The middle shelf **84** contacts the face of the matrix die **42** in direct heat exchange contact therewith as oriented and held in face-to-face contact therewith by two set screws **85** in the upper shelf **86**.

The upper shelf **86** is spaced by an air gap from the matrix die **42** and blocks heat loss therefrom in addition to being a die guide. It radiates heat downwardly enough to overcome any heat loss from the top and edges of the matrix die so that the die is uniformly heated on its die face and throughout its body.

The lower heat shelf **87** engages the lateral portion of the lower support **31**. The exposed upper face of the male die blank is spaced a substantial distance below the middle shelf and thus receives its major portion of heat through the carrier **74** from the bottom with only enough heat radiated to its upper face to bring it just below the flow point temperature.

The upper and lower shelves **86** and **87** are cut away at their center front edges to accommodate the arms **14** and **15** of the seal press frame **10**. This relationship controls the flow of heat to the two die elements as already described in relation to the application of embossing pressure to which they are ultimately subjected in use.

The wattage of the heater **81** can be varied as desired from 100 to 500 watts either initially or by resistance control (not shown) but preferably the heater is a 125 W. heater controlled by the adjustable thermostat **83** to bring the copper core **82** to 425° F. and keep it there. A higher wattage merely shortens the warm up time and shortens the heat dissipation recovery time when seal dies are being heated for processing. Preferably, a three minute warm-up has been found to be satisfactory to assure stabilized and proper distribution of heat in the die elements with a slightly cooler substrate portion at the center region of the male die. This provides a substrate coolness that serves as a solid compression resistance that assures flow of plastic into the matrix die lettering without excessive flow of lateral portions of the counter die that might bend or distort the counter die under the critical die closing heat-flow conditions that develop when the seal press is squeezed and locked as already described. In brief, with some cooler plastic resistance to plastic flow at the middle of the male die, the warmer peripheral edges accomplish the necessary plastic flow for the lettering without an overflow or danger of die support deflection. Thus, when the dies cool, there is no deflection in the lower die support when merely embossing paper. This eliminates the deflection that could otherwise flex the male die with ultimate deleterious effects. Whether the dies while closed are permitted to cool in air after forming or cooled in lukewarm water is merely a question of time and preference.

Thus, with the plastic flow controlled with some temperature differential in the male die blank, and with the application of heat to die support portions that are lightly in contact with the male die carrier that is followed by a rapid heat influx when the light contact is increased to a heavy heat transfer contact, it will be appreciated that the matrix and the male die are more perfectly matched

for embossing than has been heretofore accomplished because the dies are mated in situ ready for operation without distortion under the hand pressure to which they will be continually subjected in use. No operating conditions vary from the molding step to the work cycles except the thickness of paper whose embossment load is well within maximum closing pressures exertible upon the dies.

It should be noted that it takes a certain length of time for a matrix die to be lettered and if the heater **80** is not left "on" during the day as a production expedient, a heater element of 125–250 W. will adequately warm the core during the lettering of the matrix die. Then with the matrix die mounted and the male die blank is properly located, the die elements can be heated within three or four minutes whereupon the final hand squeeze and locking of the seal press is accomplished and the elements cooled. The seal press is then ready for immediate use.

In event the relief lettering on the male die becomes damaged, the above warm up and squeeze process can be repeated and with limited flow, the male die can be restored if the damage is not too great. This is something that cannot be done with the three conventional methods already discussed. However, if the damage or wear is beyond repair, the male die can be replaced with a new carrier and blank and the above process repeated. Replacement is accomplished merely by moving the spring **60** enough to clear the head **58** of the stud **57**. Old counter die carriers can be cleaned of plastic and reused repeatedly.

Moreover, it will be appreciated that if desired, the die assembly unit can be inserted in place by itself on the heater shelves **84** and **87** without a seal press frame and then when it is heated and ready for closing for plastic flow, a seal press frame, whether a hand or desk frame, can be slipped into working engagement with the die assembly unit while it is still on the heat shelves. The two are thereby assembled and can be withdrawn ready for immediate closing, cooling and use thereafter. Furthermore, the residual reaction of the male die material opposing the application of the forming pressure will continue and will operate to provide adequate effort to keep the latch **23** engaged when the seal press is closed and stored. A slight squeezing pressure releases the latch whenever it is desired to open the seal press for work.

In furtherance of the above description, it is of interest to note by way of example, but not by way of limitation, that the lower die support **31** is preferably of brass plate stock and the matrix die preferably is of high copper yellow brass approximately 70% Cu, 30% Zn with one or two percent Pb for machinability in forming the matrix die blank before lettering. The blank has a thermal expansion of approximately .0000011 inch per inch ° F. within the temperature range of the thermoplastic molding temperatures. The mold shrinkage rating of the thermoplastic male die material is approximately .004 of an inch per inch. The indicia in the matrix die is approximately .016 of an inch deep with facing walls defining approximately a 55° included angle and with a truncation of .005 of an inch wide at the bottom. The thickness of most paper embossed by seal presses of the type described is approximately .004 of an inch. Thus the intimate mating registration of the dies at room temperature empty is substantially identical with that at molding temperatures.

Along with the molding of the male die in working situ these figures indicate a substantially even distribution of compression forces over all mating areas when the dies are empty with a little less on the indicia than the background if the mold shrinkage of the material is as much as .006 of an inch, a range of .003 of an inch to .007 of an inch. This is very seldom accomplished with well known seal press die arrangements and as a result they sever the paper embossments generally on one side of the indicia when embossing paper. With the dies of the present invention mating perfectly, in situ, both sides of the indicia embossed in the paper are gripped evenly with a minimum of tear on either side and whatever tear might occur appears equally on both sides of the indicia.

With the two dies mating perfectly when empty, it is also understood how the approaching indicia surfaces are spaced from each other less than the distance between the background flat portions of the dies due to the foreshortened effects of the included angle of 55° whereby the sides of the die indicia thereof engage a sheet of paper between them and apply substantially their full embossing force directly to the forming of the sides of the indicia in the paper and develop therewith a compression-burnishing force that is evenly distributed on both sides of each indicia line to stretch and emboss the paper evenly with a minimum shearing or tearing. Also, with seal presses embodying the invention there is no background wrinkling around the letters since with average thicknesses of paper the flat portions of the embossment are not compressed. Yet, when the dies are closed empty, the closing pressure between the dies is expended essentially between their flat portions around the indicia so that the indicia are relieved of this strain or contact wear.

Having thus described the invention and its many novel characteristics, it will be appreciated how the objects and advantages mentioned are attained and how various modifications and changes can be made without departing from the spirit of the invention, the scope of which is set forth in the following claims:

What is claimed is:

1. The process of producing paper embossing dies in working situ for hand powered seal presses having opposing die carriers comprising, forming a matrix die having indicia over a predetermined area and mounting it in its working position on a die carrier of the hand press, supporting a thermoplastic blank of a peripheral size less than that of the matrix die in juxtaposition therewith upon a male die carrier of the hand press with grooves in the blank bounding at least two sides of the indicia area of the matrix die, simultaneously and independently heating in spaced apart relationship the matrix die and male die support to a temperature above the molding temperature and the blank thereon below its heat distortion temperature, hand squeezing the die carriers towards each other and bringing the heated matrix die and male die support under pressure into intimate heat exchange contact with the blank to heat to molding temperature and flow surface material of the blank on opposite faces thereof into the face contour of the matrix die and into interlocking relationship with the male die carrier, and maintaining the said pressure until the temperature of the matrix is brought below the heat distortion temperature of the thermoplastic blank.

2. The process of producing paper embossing dies for hand powered seal presses having opposing die carriers comprising, forming a matrix die of high heat conductive material and mounting it in its working position on a die carrier of the hand press, supporting a thermoplastic blank of a peripheral size less than that of the matrix die in juxtaposition therewith and spaced therefrom upon a male die carrier supported on a high heat conductive member of the hand press, simultaneously and independently heating the matrix die and male die support member to a temperature above the molding temperature of the thermoplastic material and the blank by radiated heat to a temperature below its molding temperature, hand squeezing the die carriers towards each other and bringing the heated matrix die and male die support member under pressure into intimate heat exchange contact with the blank to heat by conduction and flow surface material of the blank on opposite faces thereof into the face contour of the matrix die and into interlocking relationship with the male die carrier, and maintaining the said pressure until the temperature of the matrix is brought

below its heat distortion temperature of the thermoplastic blank.

3. The process of producing paper embossing dies for hand powered seal presses having opposing die carriers supported for hand power operation comprising, forming a matrix die and mounting it in its working position on a die carrier of the hand press, supporting a thermoplastic blank of a peripheral size less than that of the matrix die in juxtaposition therewith and spaced therefrom upon a male die carrier of the hand press having die securing means, simultaneously and independently heating the matrix die and counter die support to a temperature above the molding temperature of the thermoplastic material and the blank to a temperature below its molding temperature, hand sqeezing the die carriers towards each other and bringing the heated matrix die and male die carrier under pressure into intimate heat exchange contact with the blank and further heating and flow surface material of the blank on opposite faces thereof into the face contour of the matrix die and into interlocking relationship with the securing means male die carrier, and maintaining the said pressure until the temperature of the matrix is brought below the range of molding temperature of the thermoplastic blank material.

4. The process of producing paper embossing dies for hand powered seal presses having opposing die carriers comprising, forming a matrix die and mounting it in its working position on a die carrier of the hand press, supporting a thermoplastic blank of a peripheral size less than that of the matrix die in juxtaposition therewith and spaced therefrom, upon a male die carrier of the hand press, simultaneously and independently heating the matrix die and male die support to a temperature above the molding temperature of the thermoplastic material and the blank to a temperature below its molding temperature, hand squeezing the die carriers towards each other and bringing the heated matrix die and male die support under pressure into intimate heat exchange contact with the blank to further heat and flow surface material of the blank on opposite faces thereof into the face contour of the matrix die and into interlocking relationship with the male die carrier, and maintaining the said pressure until the temperature of the matrix is brought below the range of molding temperature of the thermoplastic blank to establish an elastic memory strain in the male die that tends to recover its original blank condition whereby reheating of the matrix die and remolding of the die can be accomplished under the same heat conditions and with the same results for servicing the die.

5. In a paper embossing seal press having matrix die and male die carriers driven towards each other in fixed relationship by a hand squezed seal press frame, the combination of a matrix die of high heat conductive material of a low coefficient of heat expansion of approximately .0000011 inch per inch ° F. having recessed indicia in the working face thereof with facing walls defining approximately a 55° included angle and rigidly carried by the matrix die carrier, and a male die of thermoplastic material having a mold shrinkage rating of approximately .004 inch per inch integrally heat molded in interlocked relationship on its bottom face with the male die carrier, and having its working face intimately following in the recessed indicia of the matrix in even registry therewith, and said dies having the mating indicia positions disposed within a couple thousandths of an inch and spaced equally on all sides of the mating indicia elements with the flat portions of the dies closed empty in contacting relationship.

6. A paper embossing seal comprising a matrix die carrier, a male die carrier, said carriers being supported as a unit for manually powered movement towards each other in fixed relationship, a matrix die having recessed indicia in the working face thereof rigidly carried by the matrix die support, and a thermoplastic male die of thermoplastic material having a coefficient of heat expansion at least ten times that of the material of which the matrix die is formed, said male die being integrally molded in interlocked relationship on its bottom face with the male die carrier and having its working face intimately following the recessed indicia in even registry therewith on all sides of the indicia with a closeness and even spacing on all sides that results in applying the major portion of paper embossing pressure on the slopes of the indicia as the flat portions of the dies terminally approach closely to each other.

7. In a paper embossing seal press having matrix die and male die carriers driven towards each other in fixed relationship by a hand squeezed seal press frame, the combination of a matrix die of high heat conductivity having recessed indicia in the working face thereof whose facing walls define an included angle of approximately 55° and rigidly carried by the matrix die support, and a thermoplastic male die having a shrinkage rating of .004 inch per inch ° F. integrally molded by the matrix die at its molding temperature in interlocked relationship on its bottom face with the male die carrier and having its indicia in even working registry therewith with uniform clearance between the male and female indicia when the dies are closed empty.

8. The combination called for in claim 7 in which the thermoplastic die has an elastic memory of recovery to an initially greater thicknes for die repair service remolding under heat.

9. For use in combination with an embossing seal press having opposing die carriers spaced from each other and a matrix die rigidly carried by one die carrier and a thermoplastic blank for a male die carried by the other carrier, a heating device comprising a heating element, a heat conductive metal core heated by said element, a pair of spaced heat conductive metal shelves heated by said core, the lower shelf receiving on its upper surface said other carrier in heat exchange contact therewith under resilient pressure with the blank resting on the carrier, the upper shelf radiating heat to said blank and receiving the matrix die on its upper face in heat exchange relationship therewith.

10. For use in combination with an embossing seal press having opposing die carriers spaced from each other, a matrix die rigidly carried by one die carrier and a thermoplastic blank for a male die carried by the other carrier, a molding device comprising a heating element, a heat conductive metal core heated by said element, a pair of vertically spaced heat conductive metal shelves heated by said core, the lower shelf receiving on its upper surface said other carrier in heat exchange contact therewith under resilient pressure with the blank resting on the carrier, the upper shelf radiating heat to said blank and securing the matrix die on its upper face in heat exchange relationship therewith, said shelves, converging outwardly at the angle defined by the dies in their resting position and being notched at their outer edges to receive the die end of the seal press therein.

11. A heater for molding thermoplastic seal press dies directly in working position on a seal press support member comprising a plurality of heated spaced sleeves notched at their exposed ends to receive the open end of a seal press frame therein, one of said shelves being constructed and arranged to conduct heat by contact to a matrix die engaging one side of it and to radiate heat through air to the thermoplastic die, another of said shelves being constructed and arranged to conduct heat by contact to the side of said support member that is remote to said thermoplastic die, said shelves defining an outwardly converging angle between them approximating the angle between the matrix and thermoplastic dies in their open position and the lower face of said one of said shelves being substantially parallel with the other shelf, a core in heat exchange engagement with said shelves to deliver heat and maintain them at substantially the same temperature;

heater means for said core, and thermostat means responsive to the heat of the shelves for controlling the heater means, said shelves and core being made of high heat conductive metal.

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ROBERT E. PULFREY, *Primary Examiner.*

W. F. McCARTHY, *Assistant Examiner.*