Nov. 21, 1961 A. J. HARVEY 3,009,415

ENGRAVING DIE HOLDER AND INKING MEANS

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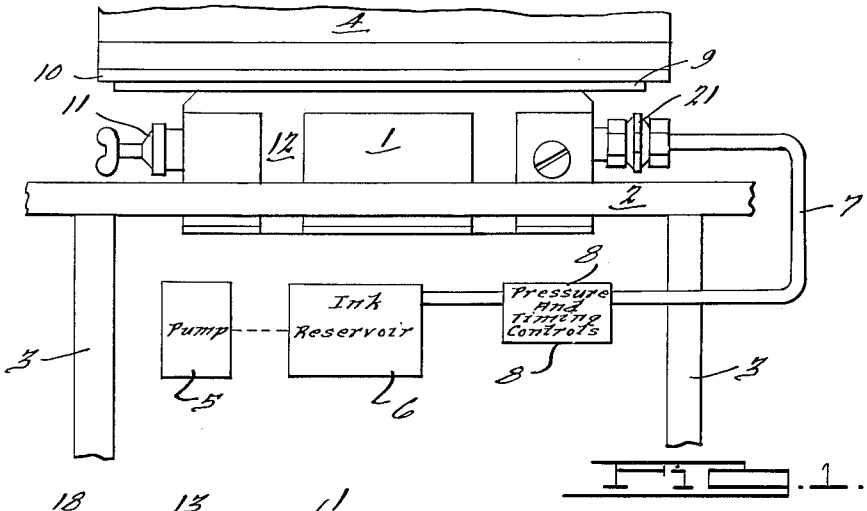


Fig. 1.

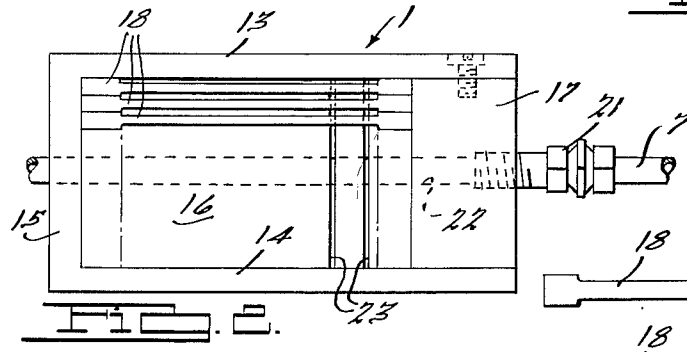


Fig. 2.

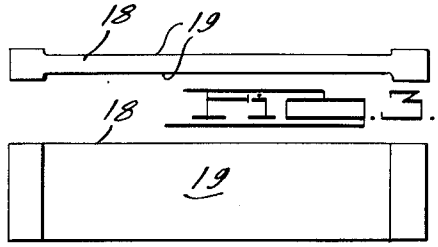
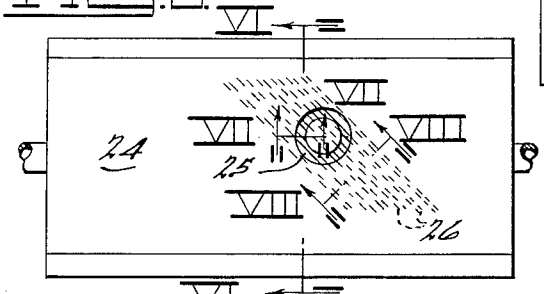


Fig. 3.

Fig. 5.

Fig. 4.



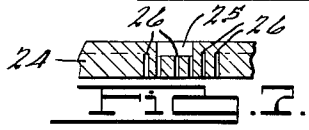


Fig. 7.

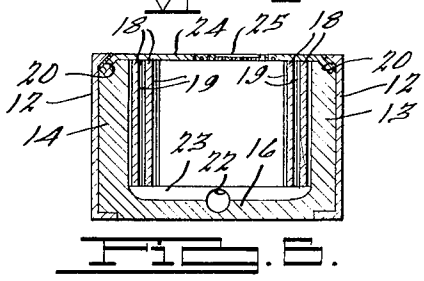


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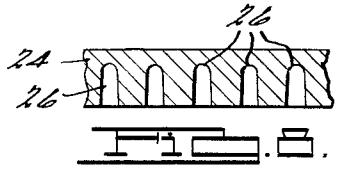


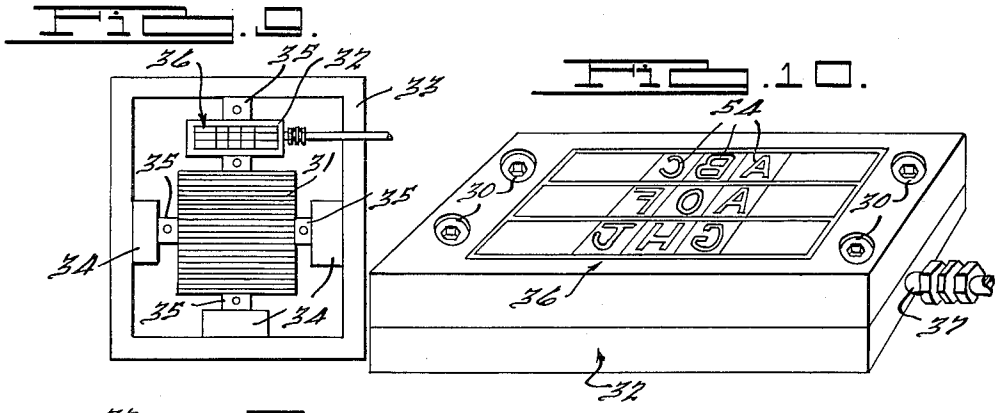
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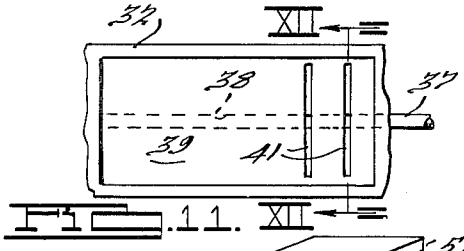
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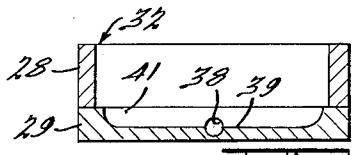
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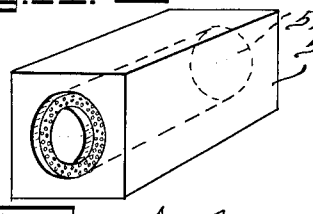
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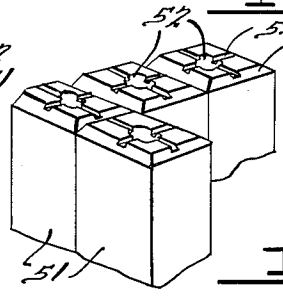
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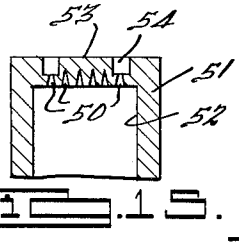


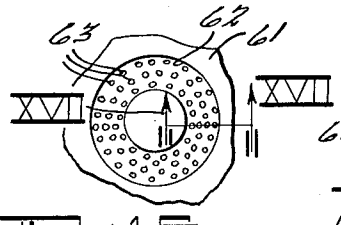


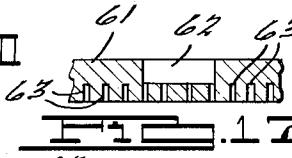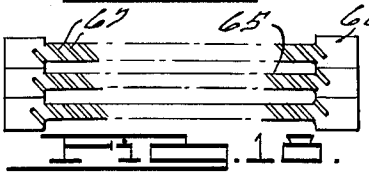




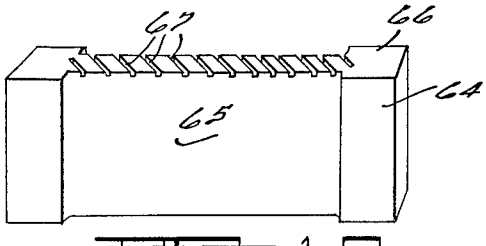












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ENGRAVING DIE HOLDER AND INKING MEANS

Filed Jan. 17, 1957 3 Sheets-Sheet 3

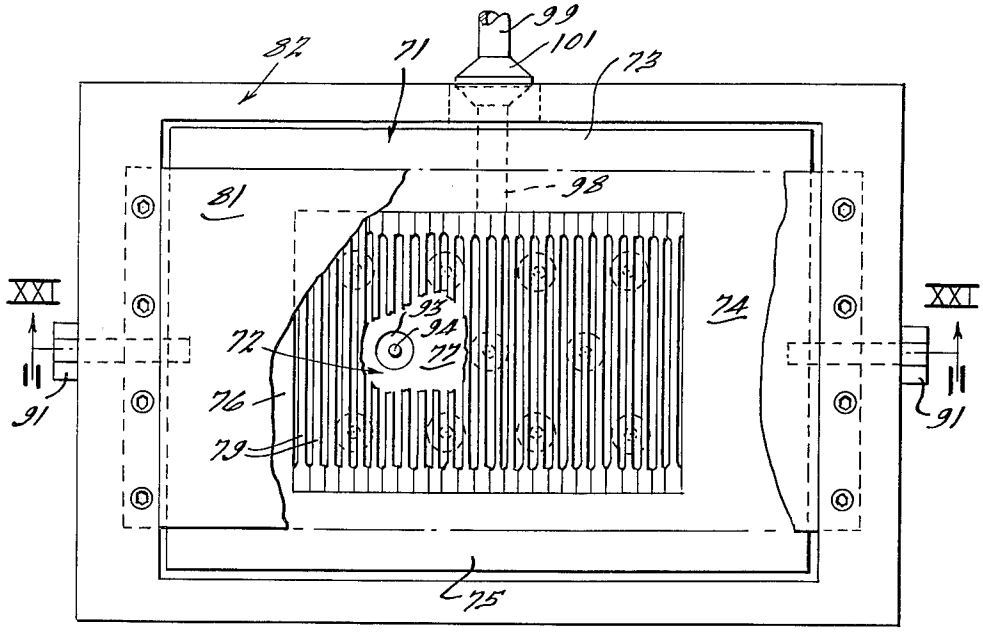


FIG. 20.

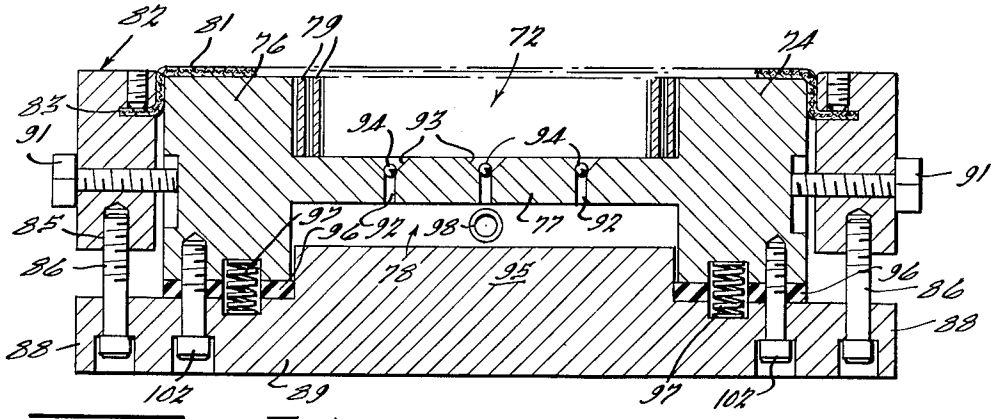


FIG. 21.

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ENGRAVING DIE HOLDER AND INKING MEANS

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9 Claims. (Cl. 101—3)

This invention relates to the engraving art and more particularly to an engraving process and the equipment for accomplishing the process, employing a pass-through engraving die plate wherein intelligence matter is passed through an engraving plate onto paper or other matter to be engraved and is deposited thereon in raised character. The process includes the facilities for producing embossed surfaces upon which the intelligence matter is deposited.

In my copending application, Serial No. 541,471, filed October 19, 1955, and now abandoned, for Engraving Die Plate and Method of Manufacture, I have described the improvements made in the engraving art by the processes employed in my invention and by the novel innovation in the manufacture of engraving die plates for engraving in the process. This invention relates to an engraving system employing engraving dies of the former application with a combined plate-holder and inking arrangement for the engraving process of the invention.

The object of the present invention is a means for accomplishing the novel engraving process of my copending application wherein a pass-through engraving die is employed and constitutes an arrangement for transferring ink or the like into a holder for the engraving die and through the die onto the material to be engraved.

A further object of the present invention is a die-holder and inking synchronizing mechanism for coordinating the transfer of ink through the engraving die at the proper time and in proper quantities to provide a controlled deposit of ink onto a surface to be engraved.

A further object, in accordance with the preceding object, is an engraving die-holder having means for the uniform transfer of ink to all characters on the engraving die regardless of the character location on the die.

A further object of the present invention is an engraving die and die-holder which may be used in combination with conventional printing type so that both engraving and printing may be accomplished on the same press and in the same operation.

A further object of the present invention is an individual character type-like engraving die block having at one end the formation of recessed characters and means at the opposite end for the facilitating transfer of inking material through the die onto a paper or the like being engraved.

A further object of the present invention is a combined engraving die-holder and inker wherein the single movement of the holder with respect to and against the material to be engraved effects both sealing of the material against the die and the transfer of the inking matter to the material to be engraved.

Another object of the present invention is an engraving die-holder adapted for the ready interchangeability of engraving dies within the holder.

Further objects and features of the invention will be readily apparent to those skilled in the art from the specification and appended drawings illustrating certain preferred embodiments in which:

FIGURE 1 is a front elevational view of the engraving die-holder and the inking mechanism employed in the present invention.

FIGURE 2 is a plan view of the engraving die-holder of the present invention with the engraving die removed.

FIGURE 3 is a view of a holder spacer as used in the present invention.

FIGURE 4 is an elevational view of a holder spacer.

FIGURE 5 is a face view of the engraving die-holder with an engraving die plate positioned thereon.

FIGURE 6 is a sectional view taken along the lines VI—VI of FIGURE 5.

FIGURE 7 is a sectional view taken along the lines VII—VII of FIGURE 5.

FIGURE 8 is a sectional view taken along the lines VIII—VIII of FIGURE 5.

FIGURE 9 is a plan view of a printer's chase enclosing set lines of printer's type and an engraving die-holder.

FIGURE 10 is a perspective view of a modified form of an engraving die-holder illustrating the use of individual engraving type-like die blocks.

FIGURE 11 is a plan view of the holder for engraving type-like die blocks shown in FIGURE 10.

FIGURE 12 is a sectional view taken along the lines XII—XII of FIGURE 11.

FIGURE 13 is a perspective view of a grouping of the individual engraving type-like die blocks used in the engraving die-holder as illustrated in FIGURE 10.

FIGURE 14 is a perspective view of an engraving type-like die block indicating the recessed character on the block.

FIGURE 15 is a partial sectional view through the engraving die block of FIGURES 13 and 14.

FIGURE 16 is a partial plan view of an engraving die-plate illustrating the recessed character therein.

FIGURE 17 is a sectional view taken along the lines XVII—XVII of FIGURE 15.

FIGURE 18 is a plan view of a modified form of holder spacer for the engraving die-holder of FIGURE 1.

FIGURE 19 is a perspective view of the spacer of FIGURE 18.

FIGURE 20 is a plan view of a modified form of combination die-holder and inking synchronized for the engraving method of the present invention.

FIGURE 21 is a sectional view taken along the lines XXI—XXI of FIGURE 20.

The engraving process of the present invention employs the dies of the aforementioned copending application and applies these dies to a combination die-holder and inking device wherein the engraving ink is supplied to the holder in a manner to be transferred through the engraving dies at the proper instance to produce the raised engraved characters while, at the same time, maintaining sufficient pressure between the die-holder and the bed of the engraving press to accomplish the required seal of the material between the holder and the bed as well as embossing of the material to be engraved up into the recessed characters in the engraving die if such embossing be desired.

In FIGURE 1 is illustrated the engraving die-holder **1** supported on the moving frame **2** of an engraving press having vertical supports **3** operating against a stationary bed **4** of the press. A pump **5** is mechanically connected to an ink reservoir **6** to transfer ink through a tube **7** to the interior of the die-holder **1** to provide at the face of the engraving die the inking material to be transferred to the object to be engraved. Pressure and timing con-

trols 8 are provided to synchronize the flow of the ink from the reservoir 6 to the die-holder 1 a sufficient time after the engraved die has contacted and become sealed against the material 9 being engraved so as to prevent spitting and irregular engraving on the material. A counter 10 of conventional construction is provided between the material 9 and the bed 4 to effect the sealing or embossing if such is desired. Such counters are conventionally formed of material having some resilience and are generally shaped or worked to provide proper mating surfaces for the characters of an engraving die. This sealing is accomplished by the application of the usual pressures of an engraving press ranging as high as 2000 pounds per square inch to accomplish desirable results on some materials. The application of this pressure effects an embossing of the material being engraved up and into the recessed characters on the die if the counter is formed to accomplish such a condition and has the primary purpose of effecting the seal of the material to the die. A valve is provided at 11 to allow the die-holder to be properly filled with ink in the initial stages of the engraving run so that inking will be uniform and complete throughout the engraving die; this valve may also function as a relief valve to prevent over-pressure within the holder and to allow for passage of excess ink.

While one combination of means including a press, an ink reservoir, a pump and timing controls have been herein shown, it should be understood that other facilities are also available equally operative. The movement of the press and its relative positions for the bed and plate-holder are also equally operative in a reverse position and this process also contemplates relative motion-producing means which may be accomplished by a rolling action between the press bed and the die-holder.

A clamp 12 is provided for maintaining the engraving die to the undersurface of the combination die-holder and inker 1 to insure proper initial positioning and additional means may be provided for alignment and support of the die on the holder including such means as a strip of tape 20 having adhesive surfaces on both sides. This type of tape is conventional in the printing arts and is used, as in this case, to stick to both the die-plate and the die-holder, thus securely positioning the engraving die.

FIGURE 2 illustrates the holder 1 as having side walls 13 and 14, an end wall 15, a bottom surface 16 an an enclosing end member 17. Between the walls 13 and 14 and the end members 15 and 17 and resting on the bottom surface 16 are a plurality of spacers 18 having their side surfaces milled at 19 to provide a small clearance between adjacent spacers. The tubing 7 carrying the ink to the holder 1 is connected to a flexible coupling 21 having an exit portion threaded into the end member 17 and cooperating with a hole 22 extending through the bottom surface 16 of the die-holder. At least one and preferably more slots 23 are cut into the bottom surface 16 of the die-holder in cooperating alignment with the hole 22 extending through the bottom surface 16 of the holder with the slots 23 extending substantially to the side walls 13 and 14 and positioned to cooperate with the milled surfaces 19 of the spacers 18. In the sectional view of FIGURE 6 is illustrated the holder having an engraving die-plate 24 supported thereon and clamped into position by the die clamp 12 and the previously described adhesive material 20 having its undersurface resting on the spacers 18 in cooperating alignment with the milled openings 19.

FIGURE 5 illustrates an engraving die-plate for use with the holder of the present invention constituting a plate having recessed character 25 on the face or outer surface thereof cooperating with recessed lines 26 on the reverse surface. One method of manufacture for the engraving die-plate will produce the character 25 and lines 26 individually partially through the plate to a prescribed depth so that at positions where the characters and lines are aligned there will be an opening through which the inking material may pass to fill the opening of the character; this pass-through operation provides the ink for the engraving process. Reference should be had to the previously mentioned copending application wherein the method of manufacture and construction of the engraving die-plate has been completely described. Engraving die-plates of the type disclosed in the aforesaid copending application can most successfully be used in the engraving process of this application; however, die-plates of other formations and made in other processes may be equally as well used herein. Such other processes may include processes of electrodeposition as the reverse of etching or other known manners. It has been found that successful results have been attained through the use of flexible metal die-plates embodying an etch resistant mesh within its structure to facilitate the required pass-through characteristics. One characteristic of a die-plate for use in the processes of this invention applies to all dies, this being that the die must be able to withstand the usual compressive forces encountered in the engraving process without collapse or movement for such failure would completely destroy the quality of the engravings produced.

FIGURE 8 illustrates the depth of cut of the lines 26 in the plate 24 where the lines and a character 25 are not aligned.

In employing the combination engraving plate-holder and inker of the present invention in the engraving process defined in the aforementioned copending application, the engraving press is actuated to move the die-holder 2 in relation to the bed 4 squeezing the material to be engraved 9 between the engraving die-holder 1 and the bed 4. Throughout this specification, reference has and will be made to movement of the die-holder toward or in relation to a press bed; this movement is relative in that the same result could be accomplished by movement of a bed toward the holder either from above or below the holder. The same results may also be accomplished by a rolling movement between the bed and die.

On the face of the bed 4 cooperating with the material being engraved is provided a conventional engraver's counter 10 having a desired preestablished construction to produce a seal between the face of the die-plate and the material being engraved. The counter may also be so constructed to produce an embossing of the material into the recessed characters on the die-plate should such be desired. The functions performed by the counter in the engraving arts are well known, these functions being performed in the process of this invention.

At the proper moment as controlled by the pressure and timing controls 8, the ink from reservoir 6 is transferred through the flexible tubing 7 to the die-holder 1 to fill the recessed characters 8 on the engraving die-plate to establish the proper quantity of ink to be transferred to the material 9, thus producing the raised characters of the engraving process. This timing is controlled to effect the ink transfer after the material 9 has been compressed to a state of being non-absorbent at least at the edges of the characters being engraved. The ink is transferred from the tube 7 into the hole 22 passing through the bottom surface 16 of the die-holder to a point where it may travel along the slots 23 to spread out to the entire cross-section of the holder 1. When the ink has been dispersed to the milled surfaces 19 of the spacers 18, it will be transferred up through the holder into an area where it may pass along the etched lines 26 of the undersurface of the engraving die-plate 24 to completely ink the undersurface thereof. With the application of pressure squeezing the engraving die-holder against the press bed 4 and by the proper selection and design of a counter-surface provided on the engraving press bed 4, the material to be engraved 9 will be embossed to the extent that it will be pressed up into the characters 25 on the engraving die-plate 24. This movement initiates actuation of the pressure and timing controls transferring the ink into the

engraving die-holder 1 and causes the ink to be passed through the characters 25 on the face of the engraving die-plate 24 and transferred to the material to be engraved 9 in the desired design. Upon release of the pressure on the inking material and upon opening of the engraving press, the material 9 will have been engraved with the design appearing on the face of the engraving die-plate 24.

The inking process of the present invention also contemplates the employment of precharged inking means in the form of a pad or other porous mesh which may be initially charged and then compressed to provide at the enclosed side of the die-plate the proper ink for transfer through to the face for producing the engraved characters.

In the engraving process herein disclosed, an engraving operation is performed each time the press is actuated and the limiting period between engraving operations is dependent only upon the speed with which materials to be engraved 9 may be placed between the engraving die-holder 1 and the bed 4 of the engraving press. As has been described in the copending application, the former engraving process requires extensive travel of the engraving die from an engraving position to an inking position with the required removal of unwanted ink from the engraving die surface. This removal not only wastes large quantities of ink, but also adds additional expense through the use of special wiping materials for the ink removal. In the present process, the only ink which is used is that which is actually transferred to the material to be engraved while a complete and uniform inking pressure is maintained at all surfaces of the engraving die-plate at the characters recessed thereon regardless of location on the die-plate. Characters of various depth and width may be formed on the surface of the engraving die 24 to produce the design and result which are characteristic of the process of engraving and engravings of many colors may be performed with a single operation of the engraving press through proper selection of holder construction. The die-holder of the present invention is also adapted for accommodation of many die plates and lends itself to the ease of change of die plates. One holder will, therefore, handle most engraving plates and each new plate need only be made to the dimensions of the holder it must fit.

The engraving process with its combination die-holder and inker of the present invention lends itself to a combination of printing and engraving in the same operation on the same press. In this specification the printing art is intended to mean the process of producing character reproduction by inking the raised face of a printer's type as well as the process of lithography and the engraving art is intended to mean the process of producing character reproduction by filling recesses with inking matter and then transferring this matter by pressing an article to be engraved into the recesses to pick up the matter.

FIGURE 9 illustrates the combination of a set of conventional printer's type characters 31 in combination with an engraving die-holder 32 all positioned within a chase 33 as is conventionally employed by printers. Furniture blocks 34 and expandable securing clamps 35 are provided therein for the required secure clamping of the printing type in the chase 33. The die-holder 32 of this modified form is adapted to support an assembly 36 of individual type-like die blocks—not to be confused with printing type—which may be assembled in a desired form as the printer assembles his printing type to build the text of characters or the design to be reproduced. The die-holder 32 may be adapted also to employ the engraving die-plates of the aforementioned copending application as illustrated in FIGURES 5 and 15.

The die-holder 32 is of two-part construction having a rectangular body portion 28 and a base 29 joined by cooperating screw 30. The two-part construction permits the assembly of the individual type-like die blocks and allows for proper sealing of the assembly before the holder is completed as will be seen hereinafter.

The bottom surface 39 of the modified die-holder 32 is provided with a coupling at 37 cooperating with a pass-through hole 38 corresponding to the hole 22 extending through a die-holder 1 at its bottom surface 16. The base of the holder is provided with slots at 41 to allow for the proper transfer of the engraving ink or the like, the slots 41 being cut deep enough to intersect the hole 38 passing through the bottom surface 39. In this manner the ink employed in the engraving process will be transferred through the tube 37 and hole 38 into the bottom of the holder 32 and will be spread along the holder in an even manner through the cooperation of the milled slots 41 with the hole 38.

The individual engraving type-like die blocks employed in this modified combination holder and inker constitute rectangular-like blocks 51 having an aperture 52 formed axially along the length into close proximity to the face at section 53 upon which mirrored or reversed characters 54 are formed so that in the process of engraving the characters will produce raised deposits of ink along with embossed surfaces if such be required. The aperture 52 extending through the individual engraving type-like die blocks 51 is bottomed and squared to produce a uniform thickness for the section 53 and at the inside thereof pass-through holes 50 are formed cooperating with the recessed portions of the characters 54 on the engraving face of the die. The individual type-like die blocks 51, the characters 54 and the apertures 50 and 52 may be formed in several processes. The entire unit may be cast or formed by electrodeposition or the unit may be worked out of a solid stock forming the apertures individually. The characters on the face of the dies may be formed in the manner disclosed in the aforementioned copending application to produce the required sharp line definition. The individual dies must be uniform in height and other characteristics to allow for grouping with other dies and must be provided with adequate means for insuring the pass-through characteristics.

In FIGURE 13 the undersurface of the engraving type-like die block 51 is shown indicating crossing valleys 55 and chamfered edges 56 with the valleys 55 cooperating with the apertures 52 provided axially in the engraving dies. The valleys 55 provide canals through which the engraving ink may pass from the milled cuts 41 to provide adequate inking at each of the individual dies 51 employed to form the text of the engraving desired. The chamfered edges 56 are provided so that when the desired text to be engraved has been assembled in the body portion 28 of the holder 32 a flexible and adhesive material may be painted into the channels formed by the cooperating chamfers to seal the surfaces between engraving dies and prevent squirting of the ink through any path other than through the engraved characters on the face of the die. Sealing between the engraving type-like die blocks may be accomplished in any known manner including, without restriction, flexible rings on each type or adhesive strips having the adhesive material on each side thereof.

It should be readily apparent from the illustrations of FIGURES 9 through 16 and from the preceding description that the combination of arts of engraving and printing may be easily accomplished by the printer who formerly could perform only printing operations because of the inadequacy of his press to perform the intricate inking processes of former engraving operations. With the facilities provided by the preceding description in combination with the synchronizing and timing devices of the formerly described engraving die-holder and inker, it may be seen that the printer may now synchronize the application of ink to the individual engraving type-like die blocks 51 with the movement of the conventional printing press against the material being printed and may produce on material inserted into the press both the printed text and an en-

graved text in one operation on a press formerly designed only for printing. A printer may now assemble any grouping of characters in the form of engraving die blocks **51** having the characters at the engraving surface thereof or he may employ the engraving die plates as produced by the methods described in the aforementioned copending application and the engraving die-holder with its inking feeds as previously described herein. The holder for the plate die and the holder for the type-like die blocks will closely conform in physical height to the height of the printing type employed in the printing arts with allowance for clearance to avoid inking the engraving dies with inking of the printing type. In this manner the holders may be positioned in the bed of a printing press along with conventional printing type and will produce both printed and engraved texts in single operations.

A further modification of the spacers employed in the combination engraving die-holder and inker of FIGURES 1 through 8 is shown in FIGURES 18 and 19 having particular application for the engraving die plate shown in FIGURES 16 and 17 and completely described in its manufacture in the aforementioned copending application. In the engraving die of FIGURE 16, an engraving plate **61** is shown having characters **62** etched into one surface thereof and finely spaced holes **63** etched into the other surface. The characters and holes cooperate at the portions of plate wherein the characters are etched to provide for the passage of engraving ink or the like. The spacers **64** are milled at **65** to provide channels to carry the ink to the top of the spacers **66**, and this top surface **66** is provided with ruled lines **67** cut into the surface to provide for the transfer of ink throughout the undersurface of the engraving die to insure adequate inking at the finely spaced holes **63** in the die plate. It should be understood that the lines **67** will be much more closely spaced than shown so as to cooperate with as many of the holes **63** as is practical. This same spacer construction may also be successfully used with the engraving die-plate of FIGURE 5 and with other dies as defined in the aforementioned copending application.

In FIGURES 20 and 21 is shown a combination engraving die-plate holder and automatic inking arrangement therefor. The holder portion of these views is, in substance, the same as that shown in FIGURES 1 through 6 constituting a holder **71** having a central cavity similar to that defined by walls **13, 14, 15** and the base surface **16** of the holder **1**. The holder **71** has central cavity **72** defined by walls **73, 74, 75, 76** and a base **77**. The base **77** has a dimension of thickness and is aligned on the walls **73–76** to provide a cavity **78** below the base **77** of generally the same dimensions as the cavity **72** above the base **77**. The holder, therefore, generally has a cross-sectional contour, as seen in FIGURE 21, in an H shape. The cavity **72** is substantially the same as the cavity of the holder **1** and is adapted to support a plurality of spacers **79** of similar construction to the spacers **18** previously described. The spacers **79** function to permit the transfer of ink or other matter through the holder to a location where it may be passed through an engraving die-plate **81** positioned thereon.

To accomplish the desired support of the engraving die, the holder **71** is surrounded by a rigid frame **82** having a groove **83** cut into the inner surface of at least two of its walls on the surfaces adjacent to the exterior of the holder **71**. The groove **83** is adapted to receive the end edges of the engraving die-plate **81** and a plurality of cap screws **84** are provided to secure the die-plate **81** in the groove **83**. The frame **82** is provided with tapped holes **85** at its bottom surface adapted to receive, at each side, at least one bolt **86** extending through aligned holes **87** in an extension **88** of the base **89** of the holder **71**. Bolts **91** are provided at each side of the holder **71** to provide alignment for the frame. The frame **82**, therefore, secures the die-plate **81** in proper position on the face of the holder **71** and, through adjustment of the bolts **86**, positions the die tightly across the holder face to seal the die against the face of the holder in an air-tight fashion.

The holder **71** is also provided with an automatic ink transfer arrangement for supplying to the engraving die-plate **81** the necessary ink to accomplish the engraving desired. To provide for this ink supplying, the base **77** of the holder **71** has a plurality of holes **92** flanged at **93** at the cavity **72** side of the holder **71**. A ball **94** is positioned in the flanged area **93** below the spacers **79** and is of such size to permit at least some clearance and movement in a direction toward the spacers **79**.

The cavity **78** is partially enclosed by an extension **95** of the base **89** having a substantially air-tight fit against the side walls defining the cavity **78**. A resilient gasket **96** is provided between the walls **74–76** of the holder **71** and the base **89** to provide additional sealing for the operation of the extension **95** within the cavity **78** and to perform an additional function in the process of engraving performed by this combination engraving die-plate holder and inker. The walls of the holder **71** and base **89** are countersunk to accommodate a strong spring **97** whose function will be described hereinafter. A plurality of adjustment bolts **102** pass through the base **89** and thread into tapped holes in the walls **74–76** of the holder **71** to provide an initial pre-tension in the assembly of the holder and base. This adjustment operates against the resilience of the gasket **96** and spring **97** to prestress the assembly against relative movement between the holder portion and base portion. As will be seen hereinafter, no movement between these two parts can be accomplished until this preadjusted stress has been overcome, this being the measure of the required force for effecting proper sealing and embossing, if such be desired, before the inking operation is performed.

The interior of the cavity **78** is provided with an access hole at **98** through which an inking material may pass into the cavity and a reservoir of ink or the like, not herein shown, is connected to the holder **71** through a tube **99** connected through the hole **98**. A one-way valve **101** is provided in the tube **99** to permit the flow of material through the tube and into the cavity only rather than from cavity back through the tube. The fit of the extension **95** is such that movement thereof into the cavity **78** will cause compression therein which will be released up through the holes **92** rather than down through the space between the walls of the extension **95** and the walls of the cavity **78**.

The combination engraving die-plate holder and inker performs the function of the mechanism shown in FIGURE 1 of the drawings without the requirement of the pump **5** and the pressure and timing controls **8**. All functions of these separate elements are included in the single device as shown herein, each operation being accomplished with proper timing.

The process of engraving with this device will now be described:

With the die-plate **81** properly positioned and secured by the frame **82** and supported on a proper press, either of the conventional engraving type or of the type employed in the printing arts, the holder will be moved toward and away, or relatively so, from a bed including a counter-surface of the desired type. Between the engraving die-plate **81** and the counter will be positioned the material upon which the engraving is to be performed. After the die has engaged the material and the counter, the force of the press will be felt against the counter. The first effect of this pressure will be to compress the material to render it non-absorbent and to emboss the material if such be desired. Before further movement may be accomplished, the prestressed tension of gasket **96** and spring **97** must be overcome and, with proper selection of the springs and gasket material, this pressure can be of high magnitude. The prestressing will require pressures to the extent that the material will be rendered non-absorbent at least at the area surrounding the charac-

ters on the die and, at the same time, the material will be embossed into the characters if such embossing is desired, the amount of embossing being determined by the counter construction. After the prestressing has been overcome, relative movement of the holder and counter toward each other may occur and will effect a piston and cylinder-like action within the holder cavity **78** to force the inking material up through the holes **92** and into the cavity **73** pushing the balls **94** out of the chamfers **93** to allow free passage of the ink. Under this compression force, the ink will be passed along the milled surface of the spacers **79** to be in a position to be passed through the engraving die-plate **81** where the characters and pass-through facilities are provided to accomplish the desired engraving. Means, not herein shown, may be provided to relieve the ink pressure beyond desired limits, thus avoiding the pushing of ink from around the peripheries of the characters on the die-plate.

Release of the pressure with return or opening movement of the press will be accomplished by reversed relative movement of the holder **71** and the counter of the press. This movement will first enlarge the compression cavity by relative movement between the extension **95** and the cavity **78**, thus releasing the pressure on the inking material before the die and bed are separated. This enlargement will draw a new quantity of inking material into the cavity through hole **98** to prepare the device for the next engraving operation. The ink remaining in the cavity **73** after an engraving has been made cannot be drawn back into the cavity **78** because of the check valve operation of the balls **94**. This operation retains an adequate supply of inking material in the chamber **73** and prevents the intake of air through the die face. Further separating movement between the holder **71** and the counter of the press will permit springs **97** to expand to their limited position established by bolts **102**.

The present combination holder and inker **71**, as well as the engraving die **81**, have been designed to be able to withstand the high pressures conventional in the engraving art. Other designs for the holder and inking cavities are available including such arrangements as the provision of a diaphragm member within the cavity **78** or a series of cylindrical mating members and holes within the same cavity, these variations being primarily a matter of preference. This same condition applies for the upper cavity **73** and the spacers **79** therein; that is, the spacers may constitute a porous member filling the entire cavity or a member having other means for transferring the inking material from the holes **92** to the inside surface of the plate **81**. The only requirement of such a member is that it be able to withstand the compressive forces of this engraving operation without collapse while providing a continuous supporting surface for the plate **81** and providing the facilities to accomplish the desired ink dispersion.

The combination holder and inker provides a facility for engraving in multicolor in one operation in any conventional press by the combination of various character groupings in separate holders or cavities of similar type, each being supplied with a different color of inking material. The separate cavities may be portions of the holder **71** including separate cavities **72** and **78** with cooperating spacers **79** and extensions **95**, respectively. The cavities are isolated from each other by the gasket material **96** at the source end of the holder and by the sealing arrangement of the die against the face of the holder **71** secured by bolts **86**. The holder may also be adapted to perform its engraving operation with thermoplastic inking materials by adapting the base **89** or entire holder with heating facilities to produce the proper liquidity in the transferred material. The holder may also be grouped with conventional printer's type and the type-like die blocks as shown in FIGURE 9 to allow for the performance of both a printing and engraving operation with each press operation as has been described. In this arrangement, provision must be made for inking of the type only without contacting the face of the engraving die-plate by the conventional printing type ink roller.

The flexible engraving die-plates herein disclosed and those disclosed in the aforementioned copending application must be able to withstand the forces of an engraving press without collapse. If the die is formed of a solid sheet, of a sheet embodying an etch-resistant mesh within its structure, or of a sheet joined to a porous backing member, both the facing sheet and the portion through which the ink is to pass must have adequate strength to withstand the compressive forces encountered.

In the engraving operations herein defined, and particularly so with the combination inker and holder, the timing of the operations is of utmost importance; that is, the material being engraved must be properly compressed or embossed before the inking operation is performed in order to insure an adequate seal between the die-plate and the material. If this seal is not effected, the engravings produced may be unsatisfactory due to "spitting" of the ink along the peripheries of the characters being engraved. In the present holder and inker, this condition is insured through the selection of strength in the spring and gasket material and the prestressing therein. Other facilities to perform the same function may also be available, this selection being only one of many available.

While certain preferred embodiments of the invention have been specifically disclosed, it is understood that the invention is not limited thereto, as many variations will be readily apparent to those skilled in the art and the invention is to be given its broadest possible interpretation within the terms of the following claims.

What is claimed is:

1. A device for applying a predetermined pattern of intelligence matter to the face of a sheet of material comprising a pass-through engraving die-plate, a holder, means in said holder for supporting said plate, a source of intelligence matter, means on said holder and supporting means cooperating to provide passages from said holder to said die plate, a press mechanism adapted to effect relative movement between said holder and said sheet of material to press said die-plate against said material, a base for said holder, means on said base and holder cooperting to apply pressure to said source of intelligence matter to urge said intelligence matter through said passages, resilient means between said base and holder for permitting relative movement between said base and holder, means for prestressing said resilient means to permit said relative movement between said base and holder only after said die-plate has been sealed against said material and after said prestressing has been overcome, and said relative movement of said base and holder effecting the application of said pressure to said intelligence matter to pass said intelligence matter through said die-plate and against said material.

2. A device for applying a predetermined pattern of intelligence matter to the face of a sheet of material comprising a pass-through engraving die-plate, a holder, means in said holder for supporting said plate, a source of intelligence matter, means on said holder and supporting means cooperating to provide passages from said holder to said die-plate, a press mechanism adapted to effect relative movement between said holder and said sheet of material to press said die-plate against said material, a base for said holder, a cylinder-like cavity in said holder, a piston-like formation on said base, said piston and cylinder being in cooperating alignment to apply pressure to said source of intelligence matter to urge said intelligence matter through said passages with said relative movement of said holder and material, and means joining said base to said holder to prestress the same and for permitting the application of said pressure to said intelligence matter only after said press mechanism has sealed said die-plate against said material and while said die-plate and material are pressed together.

3. A device for applying a predetermined pattern of intelligence matter to the face of a sheet of material comprising a pass-through engraving die-plate having said pattern recessed into one face thereof, said die-plate having means on the face opposite said patterned face defining apertures in cooperation with said pattern, a holder for said plate having means therein defining a first cavity, a bottom wall for said cavity, a plurality of spaced elements in said cavity for supporting said plate and cooperating to provide a substantially continuous surface in cooperation with said plate, a source of intelligence matter, means providing a passage for said intelligence matter from said source to said holder, means on said holder and supporting means cooperating to provide a passage from said holder to said die-plate, said means in said holder providing said passage including one-way valve means allowing passage only toward said supporting means, a press mechanism adapted to effect relative movement between said holder and said sheet of material to press said die-plate against said material, a base for said holder, a cylinder-like cavity in said holder, a piston-like formation on said base, said piston and cylinder being in cooperating alignment to apply pressure to said source of intelligence matter to urge said intelligence matter through said passages with said relative movement of said holder and material, resilient means between said base plate and holder for permitting relative movement between said base and holder, means for prestressing said resilient means to permit said relative movement between said base and holder only after said die-plate has been sealed against said material and after said prestressing has been overcome, and said relative movement of said base and holder effecting the application of said pressure to said intelligence matter to pass said intelligence matter through said die-plate and against said material, and a frame cooperating with said holder and securing said die-plate to align said die-plate on said holder.

4. In a device for applying a predetermined pattern of intelligence matter to the face of a sheet of material in raised character, a pass-through engraving die, a holder for said die, a source of intelligence matter, means in said holder and connecting said source to said holder for passing said matter to said die, means in said holder for prestressing said holder, and means for restricting the passage of said intelligence matter through said die until said prestressing has been overcome to compress said material and seal said material and said die at least where said predetermined pattern is provided.

5. A device for applying a predetermined pattern of intelligence matter to the face of a sheet of material in raised form comprising a pass-through engraving die-plate having said pattern recessed into one face thereof, a holder, means in said holder for supporting said plate, a source of said intelligence matter, means providing a passage for said intelligence matter from said source to said holder, means on said holder and supporting means cooperating to provide a passage from said holder to said die-plate, a press mechanism adapted to effect relative movement between said holder and said sheet of material to press said die-plate against said material, means for applying pressure to said source of intelligence matter to urge said intelligence matter through said passage joining said source and holder and said passages in said holder and supporting means in synchronism with said movement of said press mechanism, and said pressure-applying means being synchronized with said movement to urge said intelligence matter only after said material has been pressed against said pattern on said die-plate and while said die-plate and material are being pressed together, said source including separate sources of individual colors, and means forming individual chambers within said holder for isolating portions of said engraving die-plate and for joining said portions individually with said separate sources.

6. A device for applying a predetermined pattern of intelligence matter to the face of a sheet of material in raised form comprising a pass-through die-plate having said pattern recessed into one face thereof, said die-plate having means in the face opposite said patterned face defining apertures in cooperation with said pattern, a holder, a plurality of spaced elements in said holder for supporting said plate and cooperating to provide a substantially continuous surface in cooperation with said plate, a plurality of sources of intelligence matter of a variety of colors, means providing separate passages for said intelligence matter from said sources to said holder, means forming individual chambers within said holder and supporting means cooperating to provide separate passages from said holder to said die-plate, a press mechanism adapted to effect relative movement between said holder and said sheet of material to press said die-plate against said material, means for applying pressure to said sources of intelligence matter to urge said intelligence matter through said passages joining said source and holder, and said passages in said holder and supporting means in synchronism with said movement, and said pressure-applying means being synchronized with said movement to urge said intelligence matter only after said material has been pressed against said pattern on said die-plate and while said die-plate and material are being pressed together whereby portions of said pattern may be produced in a different one of said variety of colors with each press mechanism operation.

7. The device as claimed in claim 1 wherein said source of intelligence matter is a plurality of sources of a variety of colors, wherein said holder and support means include means forming individual chambers within said holder for isolating certain of said elements from each other, and wherein said passage means includes means for connecting said isolated elements with said separate sources whereby portions of said predetermined pattern may be produced in a different one of said variety of colors with each press mechanism operation.

8. The device as claimed in claim 3 wherein said source of intelligence matter is a plurality of separate sources of a variety of colors, wherein said holder and support means include means forming individual chambers within said holder for isolating portions thereof from each other, and wherein said passage means include means connecting said isolated portions with said separate sources whereby portions of said predetermined pattern may be produced in a different one of said variety of colors with each press mechanism operation.

9. A device for applying a predetermined pattern of intelligence matter to the face of a sheet of material in raised form with separate parts of said pattern being produced in separate colors comprising in combination, a pass-through engraving die-plate, a plurality of holders for said plate, means in each of said holders for supporting at least a portion of said die-plate, a source of intelligence matter associated to each of said holders including means providing a passage therebetween, means on said holder and supporting means cooperating to provide a passage from said holder to said portion of said die-plate supported thereby, a press mechanism adapted to effect relative movement between said holders as a group and said sheet of material to press said die-plate against said material, means for applying pressure to said sources of intelligence matter to urge said intelligence matter through said passages joining said sources and said holders and said passages in said holders and supporting means in synchronism with said movement of said press mechanism, and said pressure-applying means being synchronized with said movement to urge said intelligence matter only after said material has been pressed against said pattern on said die-plate and while said die-plate and material are being pressed together whereby said parts of said predetermined

pattern may be produced in said separate colors with each press mechanism operation.

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