July 23, 1935. H. W. HETHERINGTON 2,009,262

APPARATUS FOR MAKING MASTER PRINTING PLATES

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Fig. 1.

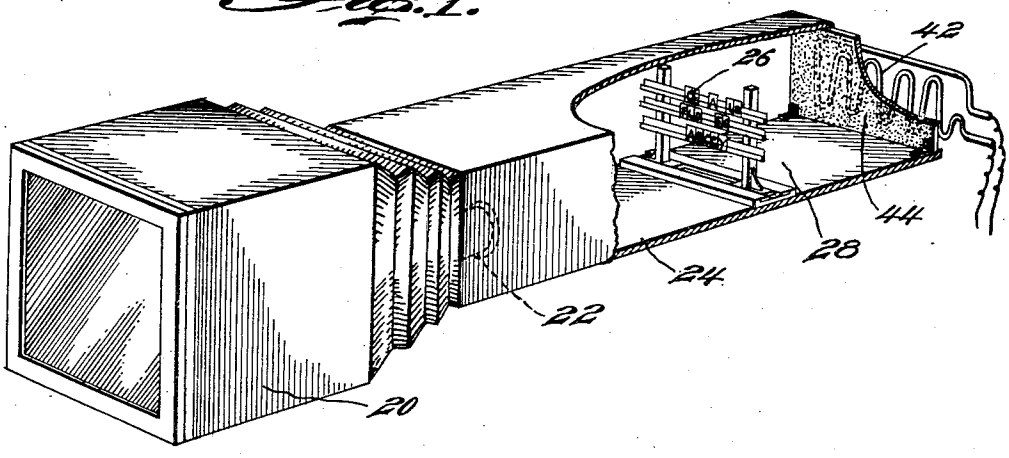
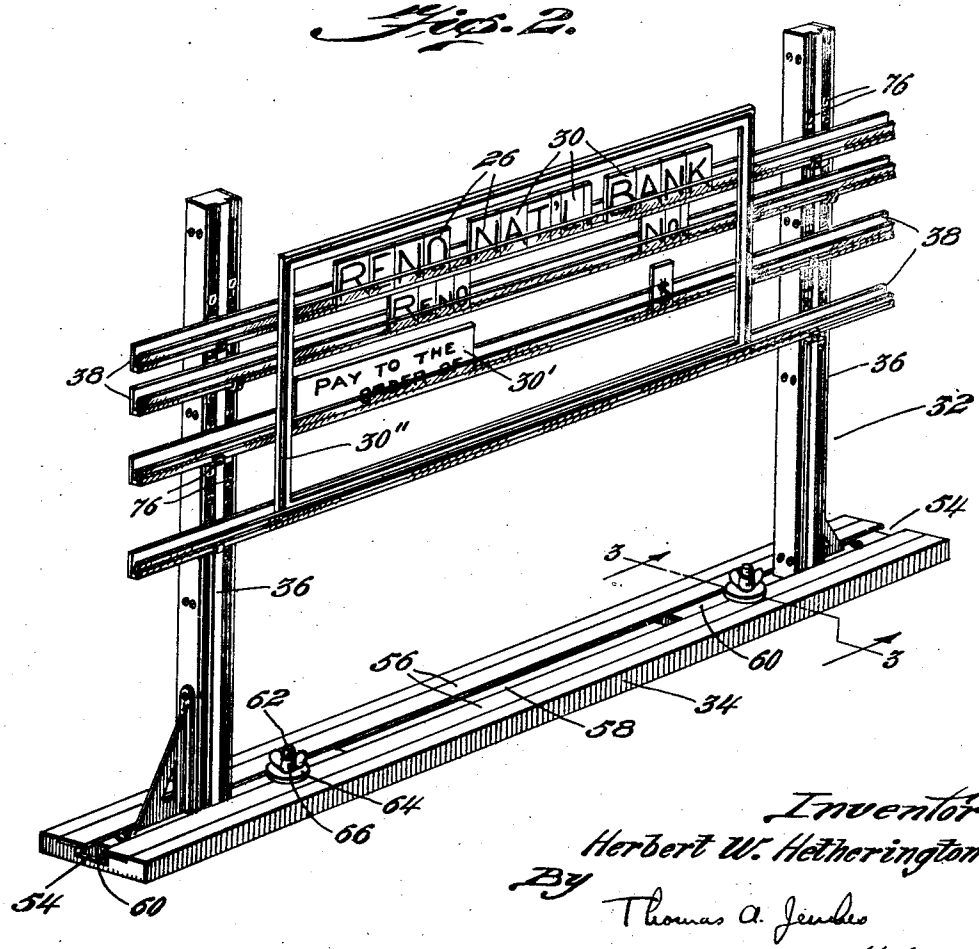


Fig. 2.



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Fig. 3.

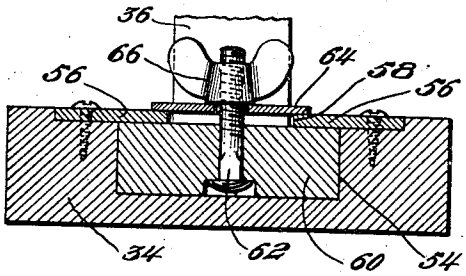


Fig. 4.

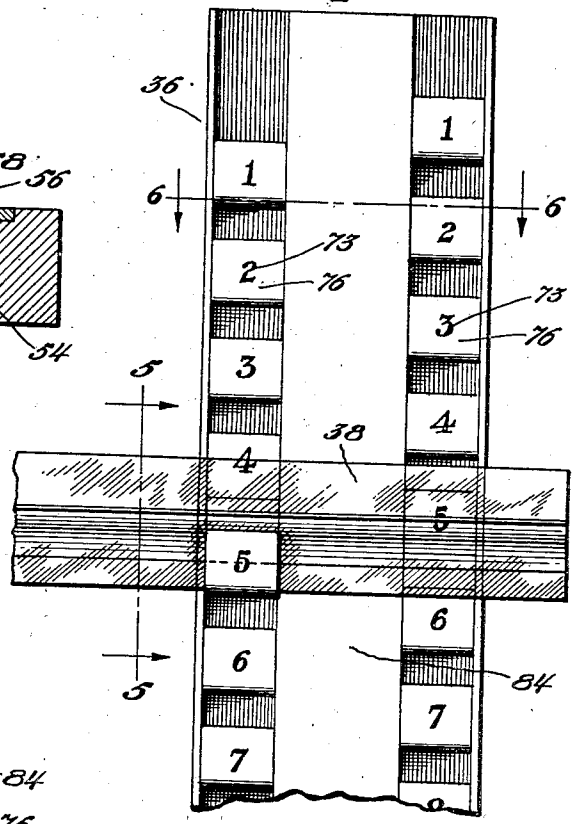


Fig. 5.

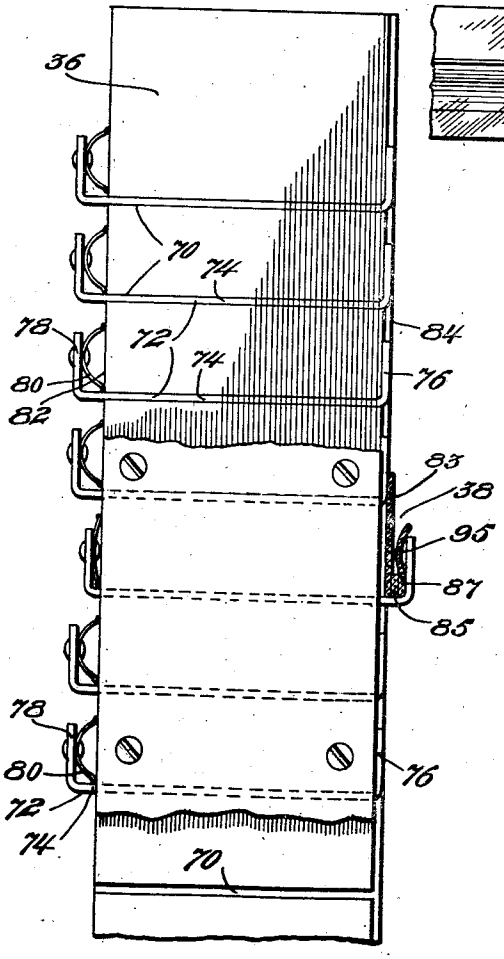
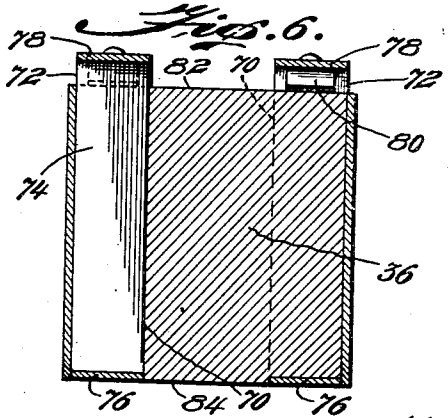


Fig. 6.



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APPARATUS FOR MAKING MASTER PRINTING PLATES

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Fig. 7.



Fig. 8.

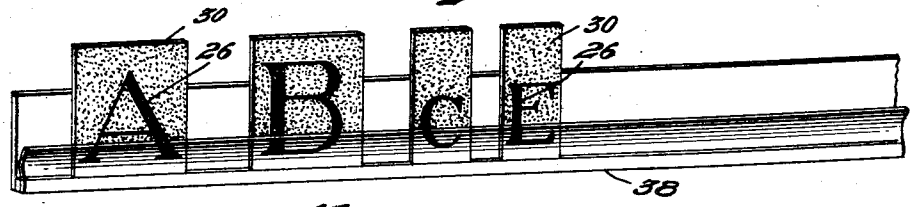


Fig. 9.

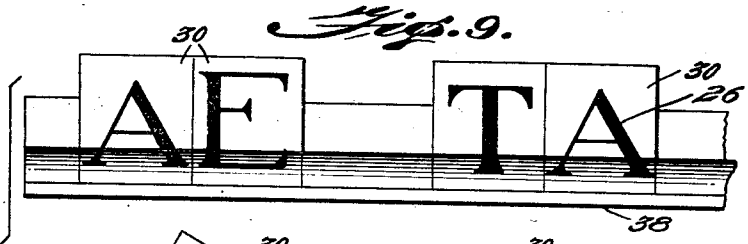
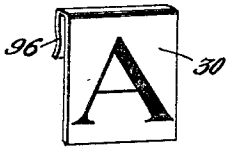


Fig. 11.



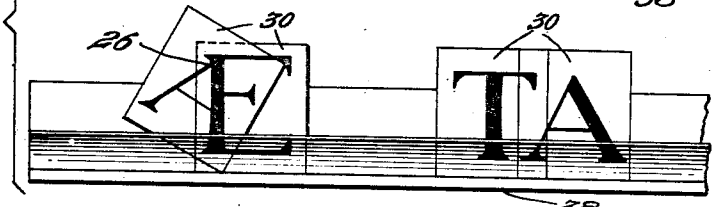


Fig. 10.

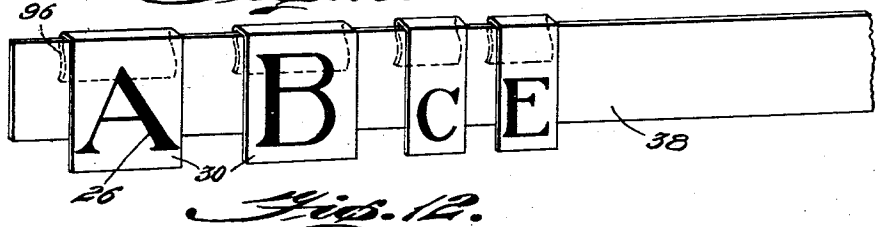
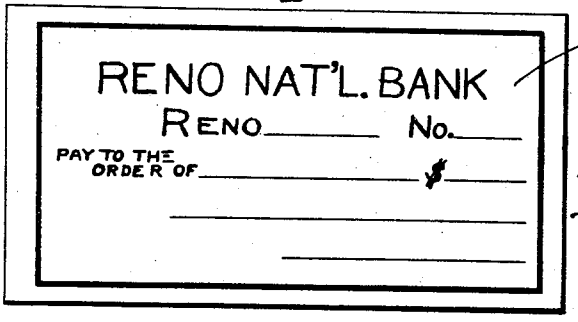


Fig. 12.



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APPARATUS FOR MAKING MASTER PRINTING PLATES

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Fig. 13.

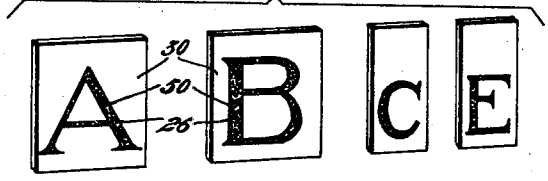


Fig. 14.

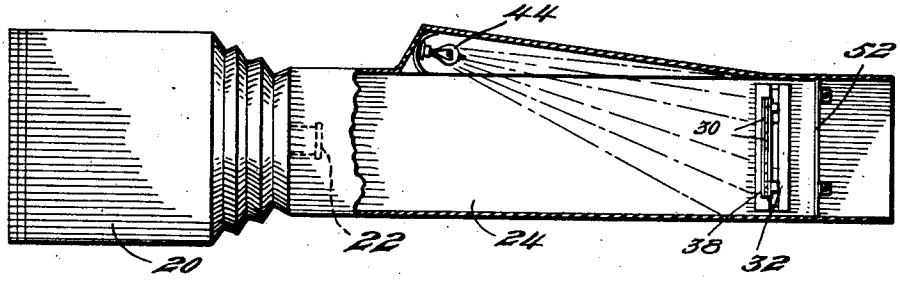
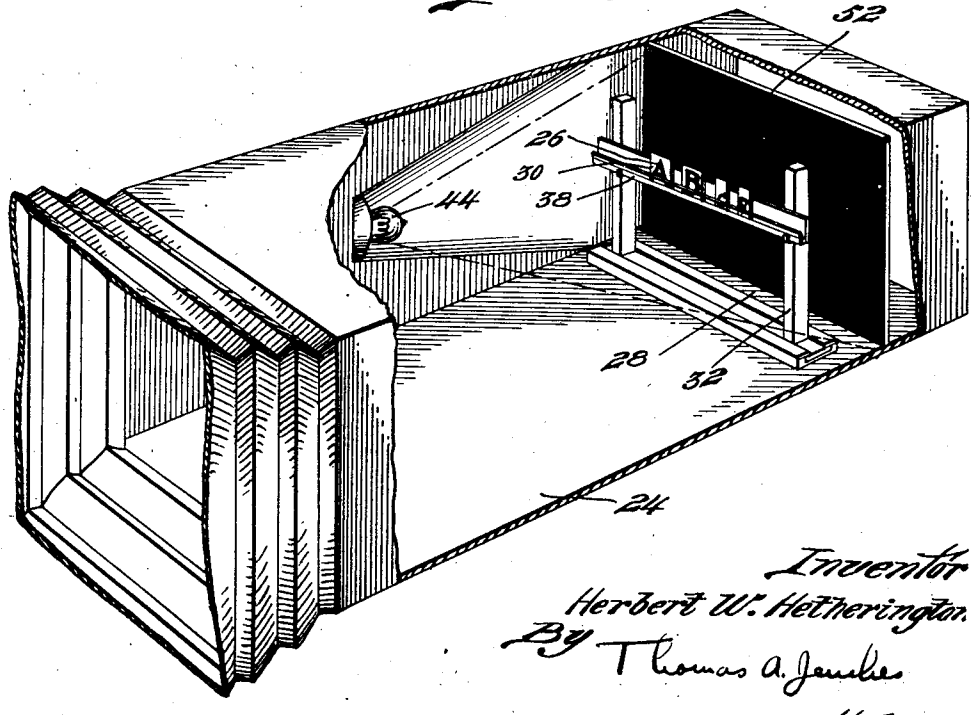


Fig. 15.



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UNITED STATES PATENT OFFICE

2,009,262

APPARATUS FOR MAKING MASTER PRINTING PLATES

Herbert W. Hetherington, Cranston, R. I., assignor to The J. C. Hall Co., Providence, R. I., a corporation of Rhode Island

Application March 6, 1933, Serial No. 659,649

15 Claims. (Cl. 88—24)

My invention relates to a novel type of apparatus and method for use in making master printing plates by facilitating the assembly of a copy for printing purposes, either by relief, etching, lithographic or offset processes, to shorten the time required for preparation and thereby to limit the expense of same in the manufacture of plates used in the various printing processes.

My invention includes a frame having transparent figure or insignia supporting means and assembled opaque lettering, borders, rules, figures, trade-marks or other material commonly used in printing processes in either printed, lithographed, drawn or photographed form, preferably mounted on a transparent or translucent background. While the opaque figures may be mounted on any suitable material, I preferably mount them on transparent or translucent cards, which in turn are mounted within a transparent area by suitable transparent means, such as transparent supporting rods.

For these purposes I provide a suitable camera having the usual lens and sensitized medium such as film or plate to take a picture of the assembly of printing forms and in front of the lens of said camera I mount a tunnel. In front of the lens in said tunnel I mount the opaque figures, which are preferably mounted on a stand also contained within the tunnel.

In my preferred embodiment for making dark figures, I preferably employ a light source behind the figures so that the figures may more boldly stand out and be projected on to the film through the lens of the camera. So far as I am aware I am the first in a device of this description to project opaque figures through a camera lens and then on a sensitized film by means of a light source located behind the figures and I am thus enabled to project sharper representations of the figures than hitherto thought possible by reflected light. Where these figures are projected by a light source located behind them, I preferably also diffuse the light which permits direct reflections from said cards and/or figure supports from being visible on the negative and I preferably do this by employing a translucent screen interposed between the light source and figures and may if desired mount the opaque figures on translucent cards so as to prevent direct reflection from the edges or sides thereof.

I may if desired, make the opaque figures light reflecting as by dusting light reflecting material thereon and in this case if the light is placed in front of the figures they will reflect white and I may put a dark background behind the transparent cards and/or transparent supporting means so that the figures will appear white against the dark background on the sensitive medium, thereby with the same cards, supporting means, etc. Providing a reversibility of type, such as for black on white and white on black and make the same apparatus suitable either for transmission or reflection of light for interchangeability and versibility of type.

My invention therefore, not only includes the combination of a camera mounted in a suitable tunnel and transparent supporting means for opaque figures in a transparent area within said tunnel and a light source either in front or behind said supporting means for the purposes heretofore described, but particularly includes specific types of means I preferably employ for mounting the opaque figures within said transparent area. For this purpose I provide laterally adjustable posts and means to mount transparent rods at selectively higher intervals on said posts with a small amount of space between the adjustable positions of said rods and said posts. As my invention specifically includes both the laterally and vertically adjustable features of the supporting rods and means, the cards are all adapted to be hung in a single plane so that the type will appear evenly on the sensitized medium.

A further feature of my invention relates to the specific type of cards I preferably employ and means I employ for mounting them on the transparent rods. I preferably employ a plurality of cards one for each figure and in making up standard sized type a plurality of alphabets, including large and small letters may be employed. If desired borders or frames, such as is desired in making up checks may also be provided for mounting on said transparent rods. In order that the type may appear even when the film is taken, I preferably space the bottom of the figures equi-distantly from the bottom of the cards on all cards employed, so as to insure that the printing will always be in a straight line. It is also apparent that my stand provides a great degree of mobility in that it is laterally adjustable and may be moved laterally within the area to any desired position and due to the means I employ for adjustably mounting the rods at selective points in close proximity to each other on said rods I am enabled to provide a large amount of flexibility in the adjustments of the lines of printing from each other. I also preferably so construct the rods as to resiliently grip the cards therein and thereby provide an additional feature of making it possible to over-

lap the cards to provide diphthongs or to compensate for the irregularities that normally occur in printing certain letters.

A further feature of my invention relates to the improvements I employ in making up the films for use in the manufacture of printing plates, which may be then made therefrom in the usual manner, my invention specifically relating to the improved method and apparatus for assembling the type insignia or figures to make up the films from which the master plates may be readily made.

These and such other objects of my invention as may hereinafter appear will be best understood from a description of embodiments thereof, such as are shown in the accompanying drawings.

In the drawings, Fig. 1 is a perspective view of the camera and tunnel I employ in the preferred embodiment of my invention with the tunnel partially broken away to show the means I employ for supporting the opaque figures within said tunnel and in front of the light source.

Fig. 2 is a perspective view of my improved supporting stand and means and cards made up to provide the form for a bank check.

Fig. 3 is a sectional view taken transversely of the supporting stand base along the line 3—3 of Fig. 2.

Fig. 4 is an enlarged front elevation of a particular post and rod end as shown in Fig. 3.

Fig. 5 is a side elevation of the post shown in Fig. 4.

Fig. 6 is a sectional view taken along the line 6—6 of Fig. 4.

Fig. 7 is a perspective view illustrating a portion of my preferred embodiment of rod with cards suitably mounted thereon employing transparent cards.

Fig. 8 is a perspective view similar to Fig. 7, illustrating a different type of translucent card.

Fig. 9 illustrates how the cards may be overlapped within my improved embodiment of supporting rod to more correctly space for printing.

Fig. 10 is a perspective view of an alternative embodiment of rod and card in which each card is provided with a hook at the upper end for suspension on a supporting rod.

Fig. 11 is a perspective view of the type of card provided with suspension hooks shown in Fig. 10.

Fig. 12 is a view of a negative made from the figures set up as illustrated in Fig. 2.

Fig. 13 shows cards employed in a modification of my invention, in which the opaque portion thereof is dusted with silver or suitable other light reflecting material.

Fig. 14 is a plan view, for making a reverse type of card from the embodiment shown in Fig. 2, of the camera and tunnel, the tunnel being partially broken away to show how with this method of employing my invention the light source is located in front of the light reflecting opaque figures and a dark background may be inserted behind, thus making the figures appear light on a dark background, the reverse of what happens in Fig. 2.

Fig. 15 is a perspective view generally similar to Fig. 1 employing the method of my invention illustrated in Fig. 14 to provide the reverse type from that shown in Fig. 2.

In the drawings, wherein like characters of reference indicate like parts throughout, 20 generally indicates a camera adapted to enclose a suitable film, plate, or other sensitized medium mounted therein and I employ the word "film" broadly to include the printing plate or any sensitized surface which may receive a pictorial impression and having a suitable lens 22 mounted on the front thereof. A suitable tunnel 24 is provided in front of the lens. In the embodiment of my invention illustrated in Figs. 1 and 2 I desire to provide black type on a white background. As stated hitherto I provide opaque figures 26 adapted to be suitably mounted within a transparent area 28. In my preferred embodiment the opaque figures are mounted on the transparent cards 30. Suitable supporting means 32 preferably comprising a base 34 with supporting posts 36 are provided on which may be adjustably mounted the transparent rods 38. The transparent rods are adapted to be adjustably mounted longitudinally on the posts 36 and adapted to support centrally thereof or within the transparent area 28 the cards 30.

In the embodiment of my invention shown in Figs. 1 and 2 adapted to produce the printing shown in Fig. 12, namely,—of a black type on a white background, the light source 42 is preferably mounted in rear of the transparent area 28 or supporting means 32. In order that there may be no sharp surfaces for the direct reflection of light I preferably provide the light diffusing screen 44, which preferably consists of translucent material in front of the light source 42 and I may if desired as shown in Fig. 8 additionally make the background of the cards themselves of translucent material. This will successfully filter out any direct reflection either from the light source or angles in the cards or rods themselves.

In the embodiment of my invention shown in Figs. 13–15, however, I am enabled by a slight variation in the position of the light source and with the addition of an opaque screen to provide printed matter of a reverse type from that provided in Fig. 2 and shown in Fig. 12, namely, a white or light type on a dark background in the ultimate product. For this purpose the cards 30 are suitably provided with the opaque figures 26 and the opaque figures 26 are dusted while still wet with light reflecting material 50 such as silver to render portions of the figures themselves actually light reflecting. These same figures, of course, if desired may be used in the embodiment shown in Figs. 1–4 where the light comes from the rear and where they will show up there as black on a light background. Thus when the light is from the front they will appear as light on a black background and when the light is in back of them they will appear as black on a light background. Thus when the light is in front of them they will reflect light and in this embodiment of my invention I locate the light source 44 which may comprise in this instance a standard incandescent lamp in front of the supporting means 32 and opaque figures 26 within the transparent area 28 as shown more particularly in Figs. 14 and 15. In this instance I also supplementally provide the dark background, such as the opaque screen 52 in rear of said transparent area 28 and inasmuch as the figures 26 are light reflecting, due to the presence of the silver or other light reflecting material, it is obvious that they will reflect the light source 44 in front of them through the lens and on to the sensitized medium within the camera 20, thus providing the reverse of what is shown in Fig. 12, namely, light figures on a dark background in the ultimate product. In the embodiment shown in Fig. 1 the light source may comprise a Cooper-Hewitt lamp, or any lamp suitable for giving sufficient

light to provide a light background and project images of the dark figures on to the negative.

My preferred construction of stand for supporting the transparent rods **38**, which in turn supports the opaque figures **26** is illustrated in detail in Figs. 2 to 6. Such a stand includes the rigid base **34** having the rigid supporting posts **36** individually laterally adjustable thereon. In my preferred embodiment the rigid base **34** is provided with the longitudinal channel **54** therein and the side plates **56** project laterally over the sides of said channel **54** to leave a slit **58** in the center portion thereof. The base members **60** are provided which are laterally slidable within said channel **54**. The supporting posts **36** project upwardly from said bases **60** through the slit **58** and I also provide projecting upwardly through said slit the threaded clamping bolts **62**. In order to clamp the base portions **60** to the base member **34**, I preferably provide washer means **64** mounted on said bolts and nut means **66** threaded on top of said bolts to lock the bases in any desired set position by clamping the washers **64** on top of the side plates **56**. It is obvious, however, that other types of laterally adjustable posts **36** and other types of means to suitably clamp them to the rigid base **34** may be employed without departing from my invention.

As stated hitherto, I provide the transverse transparent cross rods **38** for supporting the lines of individual printed matter or opaque figures **26** in alignment on said stand **32** and I provide means to make the individual rods **38** vertically adjustable on said posts **36** so that the distance between lines of type may be suitably varied. For this purpose I provide the complemental vertical rows in my preferred embodiment two of aligned transverse horizontal slits **70** in each of said posts **36**. I also provide the U-shaped hook members **72** having bases **74** of slightly greater length than said slits **70** extending through said slits **70** and having upwardly projecting front and rear U-walls **76** and **78** respectively. I also provide the spring means **80** abutting the rear U-walls **78** and post rear wall **82** to normally urge each U-shaped member **72** inwards to cause the front U-wall **76** thereof to abut the front wall **84** of said post and to resiliently clamp a rod **38** between said post front wall **84** and U-shaped member front wall **76** to secure said rod **38** to said posts **36** against lateral movement thereon. As shown more particularly in Fig. 4, I provide a plurality of vertical rows of U-shaped members **72** on each post with one U-shaped member on each post being aligned with another on the opposite post. In my preferred embodiment I preferably provide two lines of vertical rows of U-shaped members on each post located at alternate distances or staggered in relation to each other so as to provide a large plurality of positions for the rods on said posts and if desired as shown in Fig. 4 the respective U-shaped members may be numbered as at **73** to insure that the proper U-shaped members on each respective post will be employed to bring the lines of type in accurate alignment. It is thus obvious that whatever type of transparent rods may be employed that the stand itself is provided with supporting posts **36** having free adjustable lateral movement and they may be locked in any desired position and the supporting transparent rods or other means for lines of type may be adjustably vertically varied or spaced in relation to each other by changing their points of support on the various sets of hooks. In the embodiment shown in Figs. 2–10 the rods are provided with the main rear portion or wall **83**, the base portion **85** secured to the front of the lower edge thereof and the rearwardly bent resilient front portion **87** constructed out of celluloid or other resilient type of material and provided with the bends **95** projecting rearwardly thereof so as to resiliently bind a transparent card **30** between the front portion **84** and the front surface of the rod main wall **83**. As the front portions **87** are made resilient, it is obvious that if desired as shown in Fig. 9 two adjacent cards **30** may be overlapped to provide for inherent irregularities in the spacing of printed members, or tilted to make diphthongs, or other irregular features as also shown therein. With this feature of adjustability for permitting the overlapping of the cards, it is obvious that irregular spacing in printed matter may be readily overcome as in T A, Fig. 9. In the embodiment shown in Figs. 10 and 11 the cards **30** are provided with the transparent hook portions **96**, which may then be directly hooked upon the upper surfaces of the flat rods **38** shown therein. In operation the lines of type are set up from a plurality of alphabets or other figures each mounted on the individual cards **30** as shown in Fig. 2. If desired certain of the cards **30** may contain dollar signs or a plurality of words thereon, such as the card **30'**, which includes the words "Pay to the order of". If desired also certain of the cards may consist of irregular figures, such as the frame **30''** added up to enclose a check as is usual in check borders. In place of alphabets or numbers it is obvious that any other type of figures which is desired to print may be employed. The entire device is set up as shown in Fig. 2, or Fig. 14, the negative taken thereof, the suitable printing plate made from the negative in the usual manner and the ultimate check is produced therefrom as shown at **100** in Fig. 12. It is apparent therefore that instead of taking the time necessary to draw these irregular figures or numbers and take photographs of them preparatory to making up the master printing plate, it is obvious that the desired type figures or insignia may be quickly set up by an unskilled worker from a plurality of alphabets with the desired lateral and vertical spacing between types and lines in a very short period of time enabling the negative thereof to be made, which may be employed to make up the printing plate in any one of the usual manners.

It is apparent therefore that I have provided not only a novel method of preparing negatives for use in the manufacture of printing plates, but also that I have provided a novel combination of apparatuses for this purpose and specifically a novel type of opaque figures and supporting means therefor, which may be readily employed either to produce a straight black type on a light background or a reverse light type on a black background.

It is understood that my invention is not limited to the specific embodiments shown or methods described and that various deviations may be made therefrom without departing from the spirit and scope of the appended claims.

What I claim is:

1. In a device for making master printing plates, in combination, a camera having a lens, a tunnel in front of said lens, a standard having transparent cross bars in said tunnel, a plurality of transparent cards having opaque figures thereon supported in a single plane on said transparent bars, said bars and cards thus forming a transparent area constrained within said tunnel,

a source of light mounted within said tunnel behind said transparent area to transmit images of said figures from said transparent area through said camera lens onto a negative within said camera and a translucent light diffusing screen interposed between said light source and transparent area.

2. In a device for making master printing plates, in combination, a camera having a lens, a tunnel in front of said lens, a standard having transparent cross bars in said tunnel, a plurality of transparent cards having opaque figures thereon supported in a single plane on said transparent bars, said bars and cards thus forming a transparent area constrained within said tunnel, and a source of light mounted within said tunnel behind said transparent area to transmit images of said figures from said transparent area through said camera lens onto a negative within said camera.

3. In a device for making master printing plates, in combination, a camera having a lens, a tunnel in front of said lens, a standard having transparent cross bars in said tunnel, a plurality of transparent cards having opaque light reflecting figures therein supported in a single plane on said transparent bars, said bars and cards thus forming a transparent area constrained within said tunnel, a source of light mounted laterally of said tunnel in front of said transparent area to transmit images of said figures from said transparent area through said camera lens onto a negative within said camera and a dark background within said tunnel beyond said transparent area.

4. In a device for making master printing plates, in combination, a camera having a lens, a tunnel in front of said lens, opaque light reflecting figures, transparent means to support said opaque figures within said tunnel in a single plane, said means and figures thus forming a transparent area within said tunnel, a source of light mounted laterally of said tunnel in front of said transparent area to transmit images of said figures from said transparent area through said camera lens onto a negative within said camera and a dark background within said tunnel beyond said transparent area.

5. In a device for making master printing plates, in combination, a stand having a rigid base, supporting posts individually laterally adjustable thereon, sets of aligned supporting hooks projecting from posts and means to normally urge said hooks within said posts, transparent rods adapted to be selectively horizontally mounted on one of said sets of hooks, transparent cards having opaque figures thereon equidistantly spaced from the lower edge of said transparent cards and means to mount said cards on said transparent rods.

6. In a device for making master printing plates, in combination, a stand having a rigid base, supporting posts thereon, transparent rods adapted to be selectively mounted on said posts, transparent cards having opaque figures thereon and means to mount said cards on said transparent rods.

7. In a device for making master printing plates, in combination, a stand having a rigid base, supporting posts individually laterally adjustable thereon, sets of aligned supporting hooks projecting from said posts and means to normally urge said hooks within said posts and transparent rods adapted to be selectively horizontally mounted on one of said sets of hooks.

8. In a device for making master printing plates, a stand having a rigid base having a longitudinal channel therein and side plates projecting laterally over the sides of said channel to leave a slit in the center portion thereof, base members laterally slidable within said channel having supporting posts and bolts projecting upwardly therefrom through said slit, washer means mounted on said bolts, nut means mounted on said bolts to clamp said washer means against said side plates to adjustably lock the post bases in any desired set position, transparent rods having main rear portions, rearwardly bent resilient front portions and base portions joining the lower portions of said front and rear portions together, said posts having complementary vertical rows of sets of aligned transverse slits therein, U-shaped hook members having bases of slightly greater length than said slits extending through said slits having upwardly projecting front and rear U-walls, spring means abutting each of said rear U-walls and rear post wall to normally urge said front U-walls against said front post wall and to resiliently clamp said rods against the front walls of said posts, the outer front walls of aligned sets of hooks having similar identifying insignia thereon and transparent cards having opaque figures thereon equidistantly spaced from the lower edge of said transparent cards adapted to be resiliently mounted on said rod bases and be resiliently retained in position between the front and rear portions thereof.

9. In a device for making master printing plates, in combination, a stand having a rigid base, supporting posts individually laterally adjustable thereon, transparent rods having main rear portions, rearwardly bent resilient front portions and base portions joining the lower portions of said front and rear portions together, said posts having complementary vertical rows of sets of aligned transverse slits therein, U-shaped hook members having bases of slightly greater length than said slits extending through said slits having upwardly projecting front and rear U-walls, spring means abutting each of said rear U-walls and rear post wall to normally urge said front U-walls against said front post wall and to resiliently clamp said rods against the front wall of said posts, the outer front walls of aligned sets of hooks having similar identifying insignia thereon and transparent cards having opaque figures thereon equidistantly spaced from the lower edge of said transparent cards adapted to be resiliently mounted on said rod bases and be resiliently retained in position between the front and rear portions thereof.

10. In a device for making master printing plates, in combination, a stand having a rigid base, supporting posts individually laterally adjustable thereon, transparent rods, said posts having complementary vertical rows of sets of aligned transverse slits therein, U-shaped hook members having bases of slightly greater length than said slits extending through said slits having upwardly projecting front and rear U-walls, spring means abutting each of said rear U-walls and rear post wall to normally urge said front U-wall against said front post wall and to resiliently clamp said rods against the front wall of said posts, the outer front walls of aligned sets of hooks having similar identifying insignia thereon and transparent cards having opaque figures thereon adapted to be resiliently mounted on said rods.

11. In a device for making master printing plates, a stand having a rigid base having a lon-

gitudinal channel therein and side plates projecting laterally over the sides of said channel to leave a slit in the center portion thereof, base members laterally slidable within said channel having supporting posts and bolts projecting upwardly therefrom through said slit, washer means mounted on said bolts, nut means mounted on said bolts to clamp said washer means against said side plates to adjustably lock the post bases in any desired set position, transparent rods having rear portion, rearwardly bent resilient front portions and base portions joining the lower portions of said front and rear portions together, said posts having complementary vertical rows of sets of aligned transverse slits therein, U-shaped hook members having bases of slightly greater length than said slits extending through said slits having upwardly projecting front and rear U-walls and spring means abutting each of said rear U-walls and rear post wall to normally urge said front U-walls against said front post wall and to resiliently clamp said rods against the front wall of said posts, the outer front walls of aligned sets of hooks having similar identifying insignia thereon.

12. In a device for making master printing plates, in combination, a stand having a rigid base, supporting posts individually laterally adjustable thereon, transparent rods, said posts having complementary vertical rows of sets of aligned transverse slits therein, U-shaped hook members having bases of slightly greater length than said slits extending through said slits having upwardly projecting front and rear U-walls, and spring means abutting each of said rear U-walls and rear post wall to normally urge said front U-wall against said front wall of said posts, the outer front walls of aligned sets of hooks having similar identifying insignia thereon.

13. In a device for making master printing plates, in combination, a stand having a rigid base, supporting posts individually laterally adjustable thereon, transparent rods, said posts having complementary vertical rows of sets of aligned transverse slits therein, U-shaped hook members having bases of slightly greater length than said slits extending through said slits having upwardly projecting front and rear U-walls and spring means abutting each of said rear U-walls and rear post wall to normally urge said front U-wall against said front post wall and to resiliently clamp said rods against the front wall of said posts.

14. In a device for making master printing plates, in combination, a stand having a rigid base, supporting posts thereon and transparent rods adapted to be selectively mounted on said posts having main rear portions, rearwardly bent resilient front portions and base portions joining the lower portions of said front and rear portions together, and transparent cards having opaque figures thereon adapted to be resiliently mounted on said rod bases and be resiliently retained in position between the front and rear portions thereof.

15. In a device for making master printing plates, in combination, a stand having a rigid base, supporting posts thereon and transparent rods adapted to be selectively mounted on said posts and transparent cards having opaque figures thereon having hooks on the upper end thereof for hanging on said transparent rods.

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