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G. J. H. SAUSELE

3,089,402

PHOTO-TYPOGRAPHIC MASTER CHARACTER PLATE

Filed Dec. 14, 1961

3 Sheets-Sheet 1

FIG. 1a

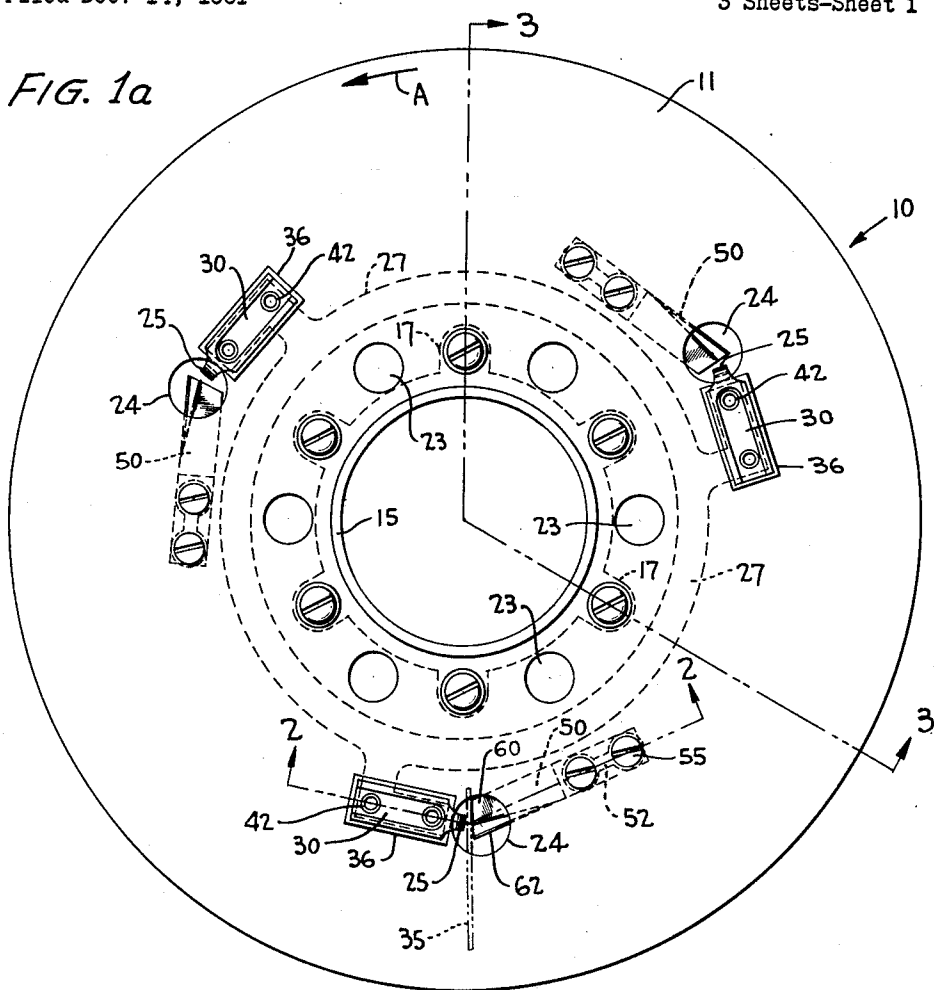


FIG. 1b

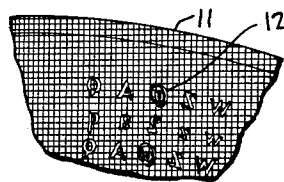
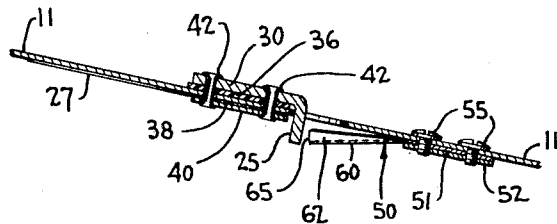


FIG. 2



INVENTOR

George J. H. Sausele

BY Watson, Cole, Grindle & Watson

ATTORNEYS

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FIG. 3

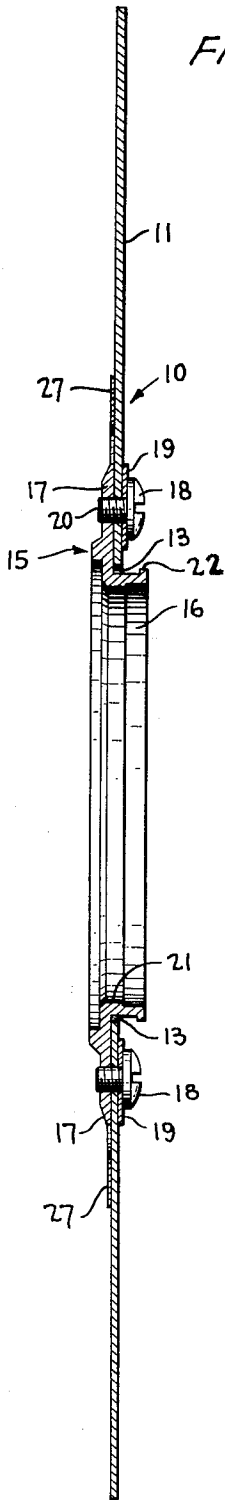


FIG. 9

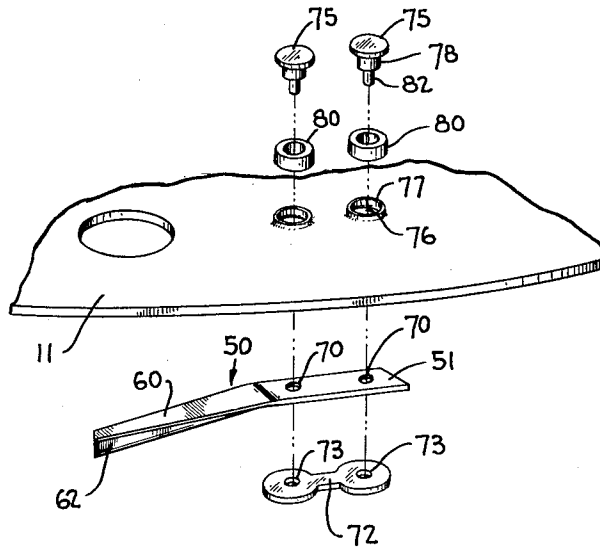
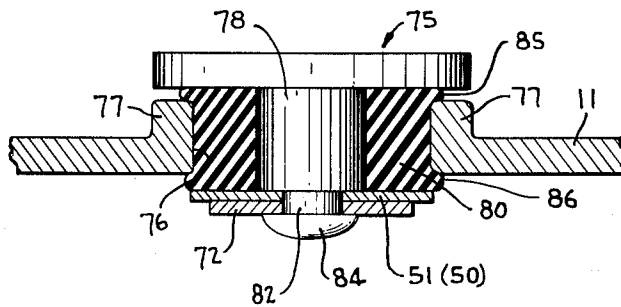


FIG. 10



INVENTOR

George J. H. Sausele

BY *Hatan, Cole, Grindle & Hatan*

ATTORNEYS

May 14, 1963

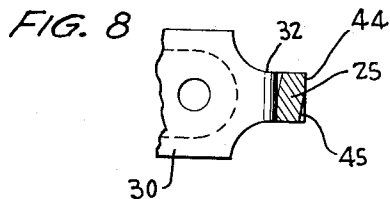
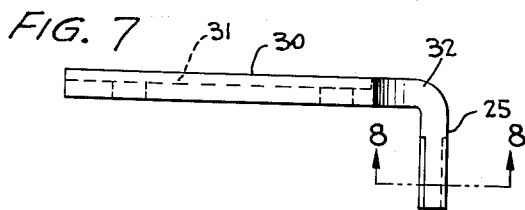
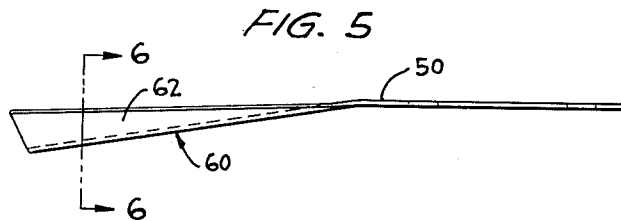
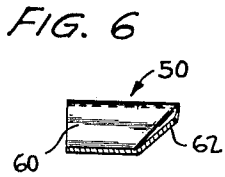
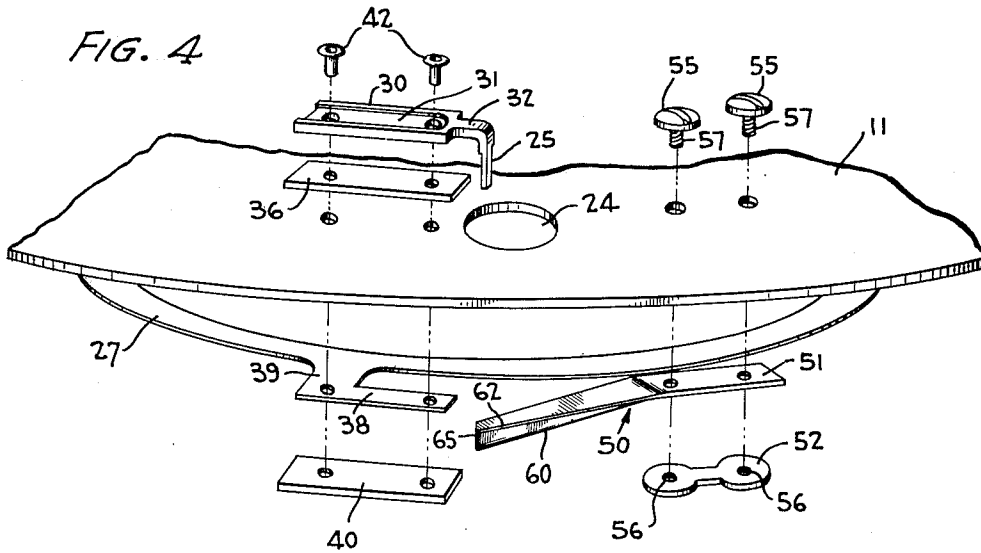
G. J. H. SAUSELE

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3 Sheets-Sheet 3



INVENTOR

George J. H. Sausele

BY *Watson, Cole, Grindle & Watson*

ATTORNEYS

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3,089,402

PHOTO-TYPOGRAPHIC MASTER CHARACTER PLATE

George J. H. Sausele, New Providence, N.J., assignor to American Type Founders Co., Inc., Elizabeth, N.J., a corporation of Delaware

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9 Claims. (Cl. 95—85)

This invention relates in general to the art of photo-typesetting, and more particularly has to do with the master plates which bear the fonts of characters from which selection is made in the production of photo-composition for printing.

Examples of the class of character plates or discs to which the present invention relates are disclosed in my co-pending applications Serial No. 686,233, filed September 25, 1957, and Serial No. 798,511 (Patent 3,011,421 of December 5, 1961).

The general object of the invention is the provision of a novel and improved master character disc for typesetting machines especially of the class described in my application Serial No. 686,233.

More specifically, it is an object of the invention to provide means embodied in the construction of said disc and its associated elements to improve the precise selection and positioning of the characters on the disc for more perfect alignment and spacing of such characters in the resulting photo-composition, and for more positively and accurately timing the events in the cycle of operation of the machine. To these ends, the invention provides for the reduction or virtual elimination of vibrations consequent upon the abrupt stopping of the disc by the interposition of selected stop blades into the path of the fairly rigid stop pins carried by the disc.

Without the ingenious provisions of the present invention, there exists the possibility of excessive vibratory rebound or reaction when one of the rapidly rotating stop pins on the disc strikes a selected stop blade of the typesetter, and not only is the vibration at a relatively long amplitude and low frequency deleterious in transmitting a clear and precisely defined image, but it can also give rise to false signals or the omission or garbling of signals through the electrical circuits involving the contact between the blades and the stop pins, which can cause serious errors in the reproduction of composition.

The problem presented is therefore that of dissipating the kinetic energy of impact between the stop pin and the blade as rapidly as possible and preventing rebound of any damaging extent.

Therefore, the invention in its preferred embodiments contemplates the provision of resilient means on the disc yieldable during a short period of contact with a stop blade but adapted to spring into position behind the blade immediately before the actual contact between the pin and the blade, and thus to limit or restrict severely the space between the pin and the resilient means within which relative vibratory movement between the pin and the blade can occur. Such a clearance space, while quite small, is of course wide enough with respect to the width of the stop blade to permit the immediate retraction of a blade when released by the latching mechanism of the typesetter.

In a variant form of the invention, the anti-bounce spring element is secured to the disc by rivets or similar fastening elements which are socketed in rubber or other similar resiliently deformable material which increases the efficiency of the device for many uses.

The dissipation of excessive kinetic energy of impact is thus accomplished by the conversion of such energy into heat by the frictional sliding contact of the yielding

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spring element with the stop blades, and by the absorption of the energy and consequent conversion to heat in the deformation of the rubber mountings.

Other objects and features of novelty will be apparent from the following specification when read in connection with the accompanying drawings in which certain embodiments of the invention are illustrated by way of example.

In the drawings:

FIGURE 1a is a somewhat diagrammatic front plan view of a character disc embodying the principles of the invention;

FIGURE 1b is a fragmentary plan view of a marginal portion of the disc, on a somewhat enlarged scale, showing a suggested arrangement of the transparent character images thereon;

FIGURE 2 is a fragmentary view in section through a portion of the disc and taken on line 2—2 of FIGURE 1a;

FIGURE 3 is a sectional view through the disc as taken on line 3—3 of FIGURE 1a;

FIGURE 4 is an exploded perspective view of a portion of the disc showing clearly the arrangement and assembly of the parts;

FIGURE 5 is a view in side elevation of one of the anti-bounce spring elements to be associated with each of the stop pins on the disc;

FIGURE 6 is a transverse sectional view taken on line 6—6 of FIGURE 5;

FIGURE 7 is a view in side elevation of one of the stop pin members;

FIGURE 8 is a fragmentary sectional view taken on line 8—8 of FIGURE 7;

FIGURE 9 is an exploded view in perspective of a portion of a disc showing the assembly of an anti-bounce spring element installation comprising an alternative embodiment of the invention; and

FIGURE 10 is a sectional view through one of the resiliently mounted securing elements for the spring element of FIGURE 9.

For a complete exposition of the general nature of the master character disc which is the subject of the present application, reference is made to FIGURES 10—14 and 23 of my co-pending application Ser. No. 686,233, and the appropriate descriptive matter in the specification of that application.

Briefly considered, the disc is of transparent material basically, but with multiple alphabets or fonts of characters imprinted upon the outer peripheral areas thereof, the characters being delineated in transparent portions of the disc with the immediately surrounding backgrounds opaque. In line with the needful and highly successful representation of these characters in precise outline and detail, the discs are not only imprinted or dyed in a novel and effective manner, but the adjustment of the disc and mounting is accomplished in a way intended to preserve and enhance such precision and accuracy.

In the drawings the novel disc assembly is designated by the general reference character 10 and the disc proper indicated at 11 carries, in this particular embodiment, three exactly duplicated sequential font areas as in the master plate illustrated in FIGURES 10 and 11 of my co-pending application Ser. No. 686,233 and also in the case of the disc shown in FIGURE 1 of my co-pending application Ser. No. 798,511. A fragmentary portion of such a font area is suggested at 12 in FIGURE 1b of the drawings of the instant application. Each of the font areas in these embodiments is of a little less than 120° in arcuate extent.

The disc is provided with a central opening 13 into which is inserted an annular hub member 15. The hub

member is provided with an annular flange 16 and a series of projecting lugs or ears 17. The ears 17 overlap the inner annular margins of the disc 11, and the disc and the hub member are rigidly secured together by means of the screws 18 which are preferably provided with small washers 19 and are threaded as at 20 to engage with the ears 17.

The internal periphery 21 of the hub 15 is precisely finished to provide an accurate running fit on the rotatable shaft assembly of the photo-typesetting machine. The concentricity of the master plate assembly must be very precisely established and maintained true.

A very small radial flange 22 is provided on one edge of the right-hand side of the hub 15 as viewed in FIGURE 3 and this flange provides a very convenient means for removal of the disc from the frictional clamping drive shaft assembly of the typesetting machine. The fingernails may be very easily inserted behind the flange 22 and the disc assembly slid axially of the drive shaft once the clamping devices have been released.

Other openings such as those indicated at 23 may be provided in order to decrease the weight of the disc and thus reduce its inertia and momentum to some extent. Still other openings 24 are provided at 120° intervals around the disc for the protrusion of the stop pins 25.

A commutator ring 27 is disposed against one face of the disc and is provided with certain extensions which are secured in intimate contact with the disc and in conducting relationship with the stop pins 25.

The construction and configuration of both the stop pins 25 and the commutator ring 27 are most clearly disclosed in FIGURES 4 and 7 of the drawings.

The stop pins comprise projections formed upon a base plate or block 30 which may, if desired, be hollowed out as at 31. The pins proper comprise shaped projections connected with the bases 30 as by means of the curved shank or neck portion 32. The pins of course project through the openings 24 and extend perpendicularly from the opposite face of the disc sufficiently to be stopped by the selectable stop blades of the photo-typesetting machine, one of these blades being indicated at 35 in FIGURE 1a.

Between the base 30 of the stop pin 25 and the front face of the disc 11 there is interposed a reinforcing spacer plate 36 which may be made of a vinyl plastic similar to the composition of the disc 11 itself.

The angular projections formed on the commutator ring 27 upon the rear face of the disc 11 are indicated at 38 and are seen to comprise a substantially rectangular projection having a short neck portion 39 connecting it with the annular ring 27.

Superposed upon the projection 38 is a backing plate 40 which may be made of any suitable material preferably metallic.

Extending through registering openings in all of these elements, the stop pin base 30, the plate 36, the disc 11, the commutator projections 38, and the backing plate 40, are the rivets 42 which are of course metallic and can be of any suitable configuration, one end of each rivet having heads adapted to be received within the recess 31 of the pin base 30 and the other end adapted to be headed over upon the backing plate 40.

Since the stop pins 25, which are substantially rectangular or oblong in section, are installed with the axes of their base portions 30 in substantially tangential or chordal relationship with the circular disc, the original forward faces suggested at 44 in FIGURE 8 would not meet these blocking surfaces of the stop blades 35 flush. Therefore, in order to improve the electrical contact, and for that matter the stopping abutment action, the forward face of the pin 25 is chamfered off slightly as at 45. The opposite face of the pin may be similarly chamfered is desired.

The purpose and function of the anti-bounce feature which characterizes the present invention may possibly be explained more clearly by a homely analogy. A child

bouncing a rubber ball in the normal way will strike the ball with his hand and when it strikes the pavement it will return to a substantial height above the ground, whereupon the child repeats the striking of the ball as long as he wants to, the ball having a relatively slow frequency and a relatively great amplitude.

Now if the child upon bouncing the ball against the pavement reaches down and holds his hand rigidly above the ball say a few inches from the pavement, the ball will bounce back and forth between the pavement and his hand at a relatively high frequency and low amplitude until the energy is exhausted and the oscillation of the ball ceases.

Similarly, if under certain circumstances, the disc assembly 10 is rotating in the normal manner and a stop blade 35 representing a certain desired character to be printed is projected in the path of the nearest approaching stop pin 25, it is possible that the rebound of the pin and disc would not only interfere with the precise photographing of the desired character image, but might also give rise to faulty signals through the electrical connection between the pins 25 and the blade 35 for the energizing of the other operative features of the photo-typesetter during its cycle.

In order to minimize such bounce or eliminate its deleterious results, a yieldable confining means is secured to the disc adjacent the pin 25 and so arranged as to permit the blade 35 to pass over it, whereupon its operative end springs back behind the blade and severely limits the ambit or range of possible oscillation between the blade 35 and the stop pin 25.

In the illustrated embodiment this restraining member which is in the form of an anti-bounce spring element is indicated at 50 and may be best understood from an inspection of FIGURES 4, 5 and 6 of the drawings.

The spring element 50 has a substantially rectangular shank portion 51 which lies flat against the rear face of the disc 11 and is reinforced by a backing plate 52 which in the present example is of the general outline of a dumb-bell. The shank portion 51 of the spring, the plate 52, and the disc 11 are all provided with registering openings through which the screws 55 may extend, the openings 56 in the plate 52 being threaded for the reception of the threaded portions 57 of the screws 55.

The resilient or yielding operative portion of the anti-bounce spring element 50 is designated 60 and comprises a blade which is bent at an angle to the plane of the shank portion 51 and the blade is also longitudinally bent at an angle to provide a flange 62.

The extreme end of the operative portion 60 of the spring member 50, indicated at 65, is positioned, as clearly shown in FIGURES 1a and 2, very close to the operative face of the stop pin 25, the spacing between the pin 25 and the end 65 of the spring 50 being only minutely wider than the thickness of the stop blade 35.

Thus, assuming the disc to be rotating in the direction of the arrow A in FIGURE 1a of the drawings, and that the stop blade 35 representing a desired character on the disc, has been projected radially inwardly of the disc beyond the circular path of the stop pins, the nearest approaching stop pin will strike the disc and halt it at the desired point so that the selected character may be photographed on film. As the pin approaches the projected blade 35 the inclined outer face of the portion 60 of the anti-bounce spring element 50 will come in contact with an edge of the blade and will be depressed as the inclined surface moves along the blade until the end 65 of the spring is reached, whereupon the resilient portion 60 of the spring member will spring back behind the blade 35 just before the pin 25 strikes the blade. Therefore, any rebound or vibratory relative movement between the pin and the blade will be restricted to an almost infinitesimal range, and an extremely high frequency which would be dissipated quite rapidly.

Naturally, the spacing between the stop pin 25 and the

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end 65 of the spring member must be very slightly greater than the thickness of the blade 35 so that when the blade latching means of the typesetter is released, the blade can very promptly descend to its idle or retracted position.

In FIGURES 9 and 10 of the drawings there is illustrated an alternative form of connection of the anti-bounce spring 50. The shank portion 51 of the spring is, as before, provided with openings as at 70 and a backing plate 72 similar to the one earlier described at 52 is provided, but the openings 73 therein need not be threaded since there are employed rivets 75 in this case for securing the parts together, rather than the screws 55.

The openings 76 in the disc 11 in this instance are of somewhat larger diameter than the corresponding openings in the previously described embodiment and the margins of the openings are preferably flared or flanged as at 77. The principal shank portions of the rivets 75 are designated 78 and this portion in each case is of a length somewhat greater than the thickness of the disc 11 plus the height of the flange 77. Inserted within each opening 76 is a small rubber bushing 80 and when the attenuated end portion 82 of the rivets 75 is inserted through the openings 70 and 73 of the shank portion 51 and the backing plate 72 respectively and headed over as at 84, the deformable rubber bushing 80 is axially compressed to some extent which causes the material of which it is composed to bulge slightly as at 85 and 86, and as clearly seen in FIGURE 10 of the drawings this arrangement provides a resilient retaining means for the anti-bounce spring member 50 which will additionally absorb the kinetic energy of vibration of the spring. Obviously, this kinetic energy is transformed into minute quantities of heat both by the friction of the blade against the portion 60, 62 of the spring 50 and the deformation of the rubber mounting 80.

It is understood that various changes and modifications may be made in the embodiments illustrated and described herein without departing from the scope of the invention as defined by the following claims.

Having thus described the invention, what is claimed as new and desired to be secured by Letters Patent is:

1. A master character plate for photo-typesetting machines or the like, comprising a flat rotatable disc of transparent material bearing at least one font of printing characters, the characters being disposed in accurate alignment upon the disc, at least one stop pin projecting substantially perpendicularly from one face of said disc and adapted to abut selected ones of a series of stop blades carried by the machine to which the disc may be applied and projectable into the path of said stop pin during rotation of the disc, and a yieldable member carried by said disc adjacent said stop element and adapted to be displaced slightly by the stop blade as the stop pin approaches the latter and to move back behind said stop blade when contact between the stop blade and the stop pin is imminent, whereby excessive rebound of the stop pin and therefore of the disc is prevented.

2. The master character plate as set forth in claim 1 in which the disc is provided with an opening therethrough of much greater area than the cross-section of the stop pin, in which the stop pin is provided with a flat base portion secured against one face of said disc, and the pin proper extends at substantially right angles to said base and through said opening to project on the opposite side of the disc.

3. The master character plate as set forth in claim 2 in which the pin proper is supported out of contact with the margins of the opening in said disc and is generally of rectangular cross-section but not squared up with a radius of the disc along which a stop blade is projected, and one face of said pin is chamfered to provide sufficient area in a radial plane for efficient face to face electrical contact with the stop blade.

4. A master character plate for photo-typesetting ma-

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chines or the like, comprising a flat rotatable disc of transparent material bearing at least one font of printing characters, the characters being disposed in accurate alignment upon the disc, at least one stop pin projecting substantially perpendicularly from one face of said disc and adapted to abut selected one of a series of stop blades carried by the machine to which the disc may be applied and projectable into the path of said stop pin during rotation of the disc, and a resiliently yieldable member carried by said disc adjacent said stop element and adapted to be displaced slightly by the stop blade as the stop pin approaches the latter and to spring back behind said stop blade when contact between the stop blade and the stop pin is imminent, whereby excessive rebound of the stop pin and therefore of the disc is prevented, the space between the adjacent surface of the yieldable member and the stop pin being only minutely wider than the thickness of said stop blade, whereby the amplitude of rebound vibration is confined to a minimum but no obstruction is offered to the retraction of the stop blade.

5. A master character plate for photo-typesetting machines or the like, comprising a flat rotatable disc of transparent material bearing at least one font of printing characters, the characters being disposed in accurate alignment upon the disc, at least one stop pin projecting substantially perpendicularly from one face of said disc and adapted to abut selected ones of a series of stop blades carried by the machine to which the disc may be applied and projectable into the path of said stop pin during rotation of the disc, and a resiliently yieldable member carried by said disc adjacent said stop element and adapted to be displaced slightly by the stop blade as the stop pin approaches the latter and to spring back behind said stop blade when contact between the stop blade and the stop pin is imminent, whereby excessive rebound of the stop pin and therefore of the disc is prevented, said resilient yieldable member comprising a leaf spring element having one end portion secured to said disc in the vicinity of the point of securement of the stop pin, the remaining portion of said spring element being bent to extend away from the surface of said disc at a very acute angle, the longitudinal axis of the element being approximately chordal to the circular rotative path of the stop pin, and the distal end of the spring is spaced a slight distance from the blade contacting surface of the stop pin, at least a portion of the thus inclined outer surface of the element extending from the surface of the disc a distance slightly greater than the spacing between the disc surface and the path of the adjacent edge of a stop blade, whereby the element is resiliently displaced toward the disc by sliding contact with the blade but springs back behind the blade immediately before contact between the pin and the blade occurs.

6. The master character plate as set forth in claim 5 in which the outwardly angularly extending portion of the spring element is bent approximately longitudinally to stiffen it somewhat in resisting rebound vibration.

7. The master character plate as set forth in claim 5 in which said end portion of the spring element is resiliently secured to the disc.

8. The master character plate as set forth in claim 5 in which said end portion of the spring element is provided with at least one opening through which a headed fastening element passes, the fastening element also passing through an opening in said disc of greater diameter, a resiliently deformable bushing passing through the opening in said disc and surrounding the fastening element, said bushing being compressed axially between the head of the fastening element and the said end portion of the spring element on the respective opposite sides of the disc, and substantially confined between the fastening element and the walls of the opening in the disc, the distance between the head of said fastening element and the end portion of the spring element being somewhat greater than the thickness of the disc, whereby said deformable bush-

ing may bulge outwardly over the margins of the opening in the disc on both sides thereof.

9. A master character plate for photo-typesetting machines or the like, comprising a flat rotatable disc of transparent material bearing at least one font of printing characters, the characters being disposed in accurate alignment upon the disc, at least one stop pin projecting substantially perpendicularly from one face of said disc and adapted to abut selected one of a series of stop blades carried by the machine to which the disc may be applied and projectable into the path of said stop pin during ro-

tation of the disc, an annular hub member secured within an axial opening in the disc, a tubular portion of the hub member extending axially of the disc, and provided with a small annular radially extending flange to facilitate manual removal of the character plate from a machine to which it is applied.

References Cited in the file of this patent

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