

[54] **FONT STRIP AND RETAINING MECHANISM FOR A PHOTOCOMPOSING MACHINE**

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[51] Int. Cl.² **G03B 17/06**

[58] Field of Search 354/5, 12, 14, 15, 19

[56] **References Cited**

UNITED STATES PATENTS

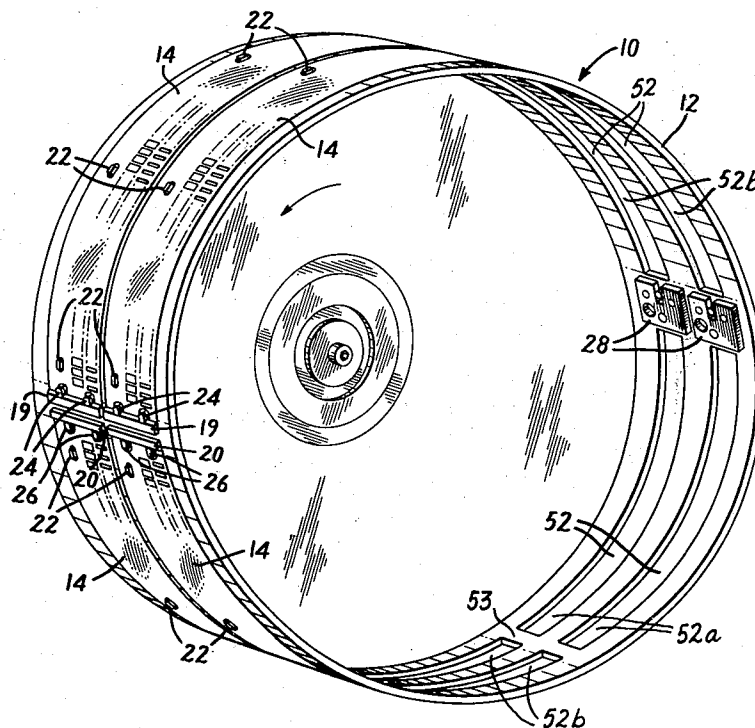
3,610,121 10/1971 Hanson 354/15

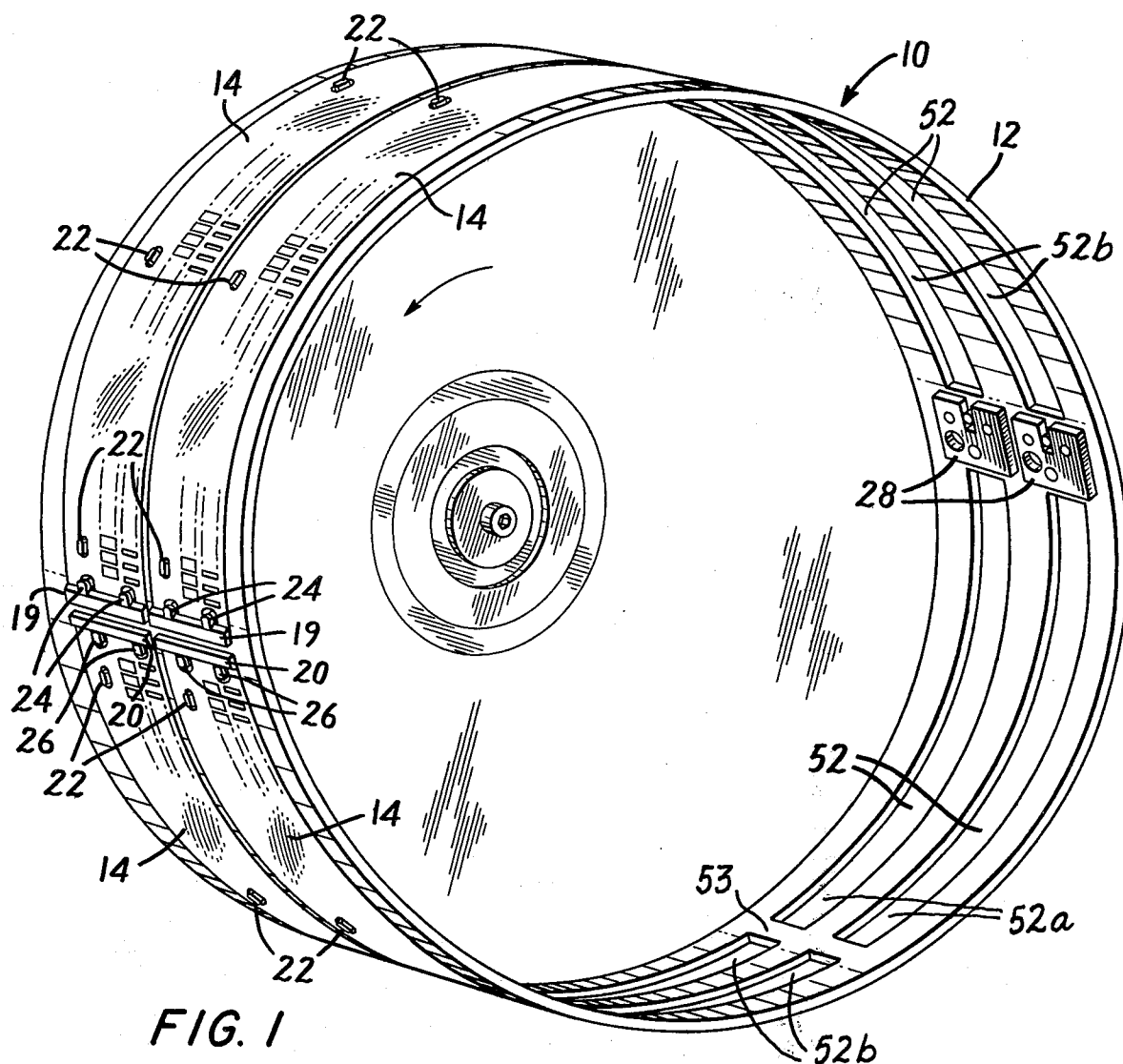
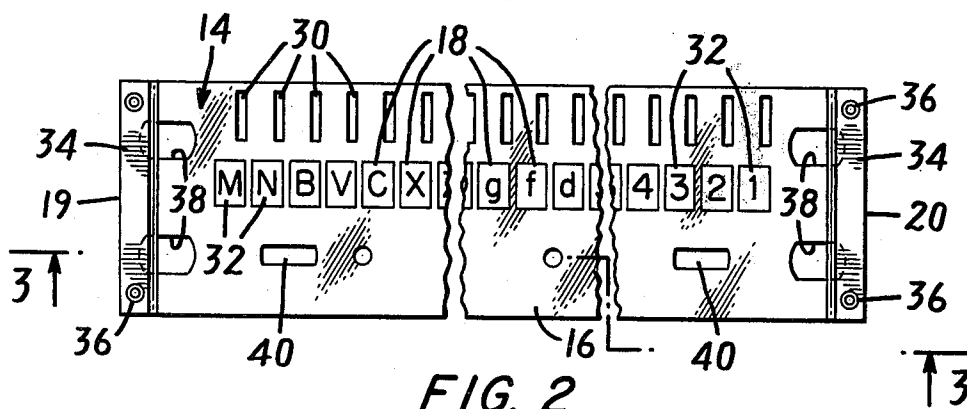
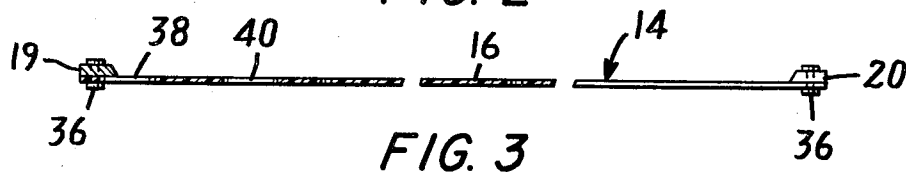
Primary Examiner—John M. Horan
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Donohue & Raymond

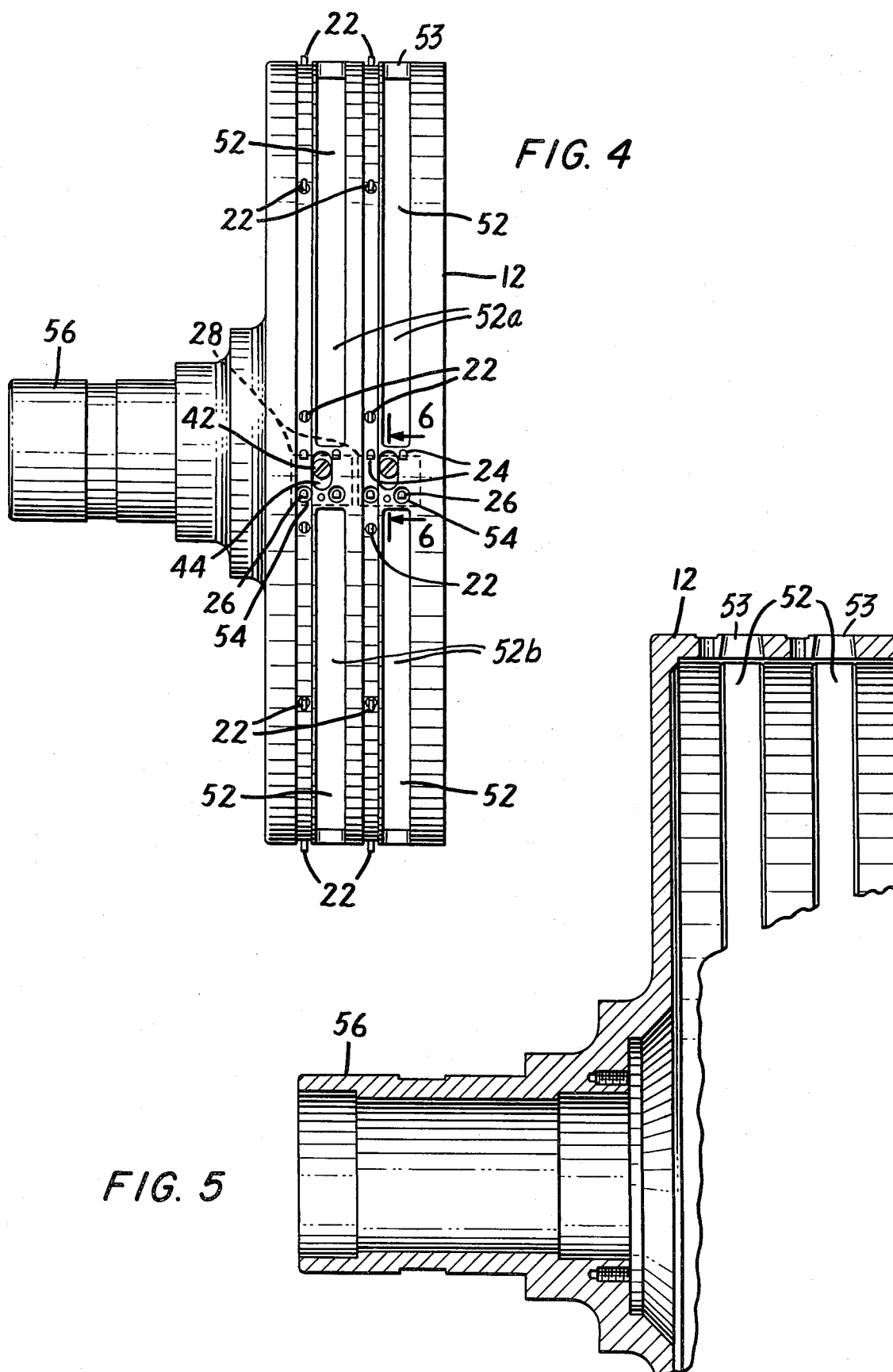
[57] **ABSTRACT**

A replaceable font strip for a photocomposing machine includes a flexible band of photographic film having typographical characters and timing marks disposed in longitudinal successions along one side thereof. Guide apertures are distributed along the other side and retaining apertures are located at each end. A rotatable character drum of a photocomposing machine is provided with means for guiding and removably retaining at least one font strip in proper alignment on the drum surface. The guiding means include a plurality of guide pins disposed around and protruding from the periphery of the character drum. The font strip retaining means include stationary and movable retaining pins for insertion, respectively, in the retaining apertures at the opposite ends of a font strip. The movable retaining pin or pins are biased in the circumferential direction of the character drum to maintain tension on the font strip.

10 Claims, 9 Drawing Figures







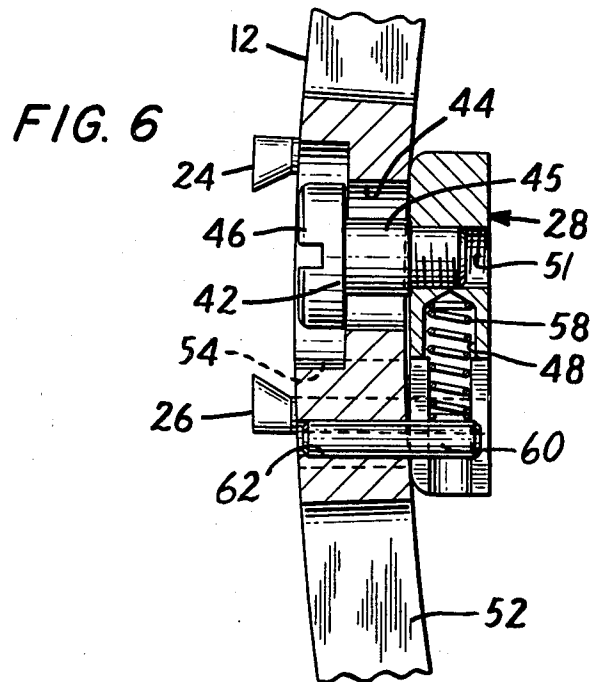
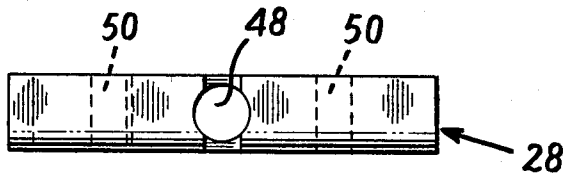


FIG. 8

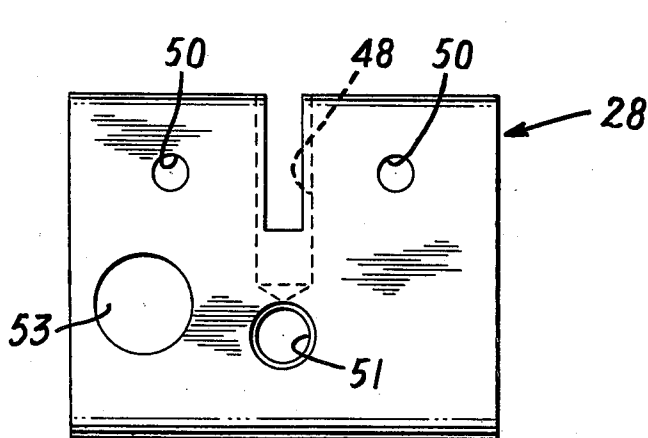


FIG. 7

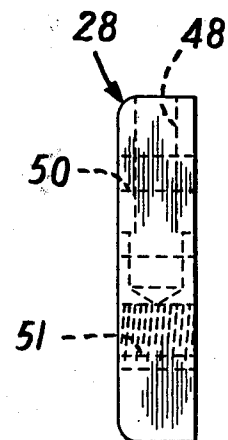


FIG. 9

FONT STRIP AND RETAINING MECHANISM FOR A PHOTOCOMPOSING MACHINE

BACKGROUND OF THE INVENTION

The present invention relates to a font strip and a font strip retaining mechanism for use in a phototype-setting or photocomposing machine.

Phototypesetting or photocomposing machines have been developed in the last several decades to an advanced state of the art. Machines of this type which are disclosed, for example, in U.S. Pat. No. 3,610,121 issued on Oct. 5, 1971 to E. P. Hanson, et al and U.S. Pat. No. 3,738,236 issued on June 12, 1973 to W. O. Grube, et al function to project selected type characters onto a photosensitive surface in a justified line. Typically, a phototypesetting machine includes a disc or drum on which are disposed, in one or more circular tracks, a plurality of typographical characters including letters, symbols, punctuation marks and the like in one or more type fonts. The disc or drum continuously rotates at high speed to successively present individual typographical characters to the object position of an optical scanning system. At the instant that a desired character is located at the proper position, the character is illuminated by a flash lamp so that its image is formed by the optical system on the surface of a light-sensitive medium such as photographic film or paper.

Photocomposing machines of recent vintage are generally provided with replaceable character carriers such as flexible bands of photographic film or the like having one or more fonts of typographical characters disposed in longitudinal tracks thereon for selective imaging on the light-sensitive medium. Such character carriers, or "font strips" as they are called, are designed to be attachable to and removable from the rotatable character drum to permit a change of font.

Depending upon the type of printing done with a photocomposing machine, the character font is changed more or less frequently by the operator. Particularly in the case of small machines which may be used, for example, in small printing shops, to print in various different styles for different customers, the font strips must be quickly and easily interchangeable.

SUMMARY OF THE INVENTION

It is accordingly an object of the present invention to provide a font strip and a mechanism for retaining the font strip on the rotatable character drum of a photocomposing machine which permits the font strip to be quickly and easily attached to, and removed from, the character drum.

It is a further object of the present invention to provide a font strip and retaining mechanism of the abovedescribed type, which is durable, reliable and yet simple and inexpensive to manufacture.

It is a further object of the present invention to provide a font strip and retaining mechanism of the abovedescribed type which adds no appreciable thickness to the character bearing portion of the character drum, so that the photocell of the timing system of the photocomposing machine may be arranged as close as possible to the timing marks on the font strip.

A further object of the present invention is to provide a font strip for a photocomposing machine which has its timing pickets as close as possible to the characters comprising the font of type so that normal stretching of

the font strip does not distort the relationship between the timing marks and their respective characters.

Still another object of the present invention is to provide a retaining mechanism for a font strip comprising a slotted drum over which the font strip is mounted providing full support for the edges of the font strip so that characters and timing marks can be adjacent each other on the font strip.

The foregoing objects, as well as other objects which will become apparent from the discussion that follows, are achieved, according to the present invention, by providing mounting means for a font strip which comprises at least one stationary retaining pin rigidly attached to the periphery of the cylindrical member and at least one movable retaining pin mounted on a spring-loaded supporting block attached to the inner portion of the circumference of the drum.

The font strip comprises a flexible film strip having at each end one or more holes arranged to fit over the stationary and movable retaining pins and may further comprise reinforcement strips at either end to prevent tearing. Characters and timing marks are adjacent to each other on the font strip, and the characters are arranged with a longitudinal base line in order to insure accurate alignment of type set with the font strip.

BRIEF DESCRIPTION OF THE DRAWINGS

In the drawings:

FIG. 1 is a perspective view of a rotatable character drum;

FIG. 2 is a top schematic view of a flexible character carrier or font strip;

FIG. 3 is a partial cross-sectional view of the character carrier of FIG. 2;

FIG. 4 is a side view of the character drum of FIG. 1;

FIG. 5 is a broken sectional view of the character drum of FIG. 4;

FIG. 6 is a cross-sectional view of the character drum showing including a cross-sectional view of the font strip supporting block;

FIG. 7 is a front plan view of the supporting block;

FIG. 8 is a top plan of the font strip supporting block; and

FIG. 9 is a side plan view of the font strip supporting block.

DETAILED DESCRIPTION OF THE EXEMPLARY EMBODIMENT

Referring generally to FIG. 1, a rotatable character drum 10 comprising a cylindrical member 12 with four "font strips" or character carriers 14 mounted thereon is shown. Each of the character carriers 14 is held in place on the cylindrical member 12 by guide means including a plurality of guide pins 22 disposed around and protruding from the periphery of the cylindrical member 12. Each character carrier 14 is retained on the cylindrical member by two stationary retaining pins 24 at one end 19 and two movable retaining pins 26 at the other end 20. The movable retaining pins 26 are rigidly attached to a supporting block 28 which is slidably spring mounted on the inside of the periphery of the character drum 10.

Referring generally to FIGS. 2 and 3, a character carrier 14 is shown to comprise a band of flexible material 16, such as a developed photographic film, having disposed thereon two longitudinal successions of elements, the first of which 30 comprises a series of timing pickets 30 having a light transmissivity opposite that of

the substantial portion of the flexible material 16. The second succession of characters 32 comprises the set or font of type of that particular carrier 14. It should be recognized that the characters 23 are schematic representations of characters actually used on the carrier 14. The characters 32 actually have a transmissivity to light opposite that of the surrounding portions of the character carrier 14. The characters 32 are shown schematically to be centered within blocks 18 or so-called "em" squares in order to show the alignment of the characters 32 in relation to the alignment of the timing pickets 30. Normally, only the characters 32 and timing pickets 30, and not the em squares 18, are visible when the character carrier 14 is viewed.

At each end 19, 20 of the character carrier 14 there is attached a rigid supporting strip 34 which may be made of any suitable material such as a metal or plastic. The supporting strips 34 are attached to the flexible material 16 by any suitable means such as by rivets 36. Adjacent each supporting strip 34 is formed a pair of retaining holes 38 adapted to fit over the retaining pins 24, 26 on the cylindrical member 12. The character carrier 14 further comprises a plurality of substantially rectangular guide holes 40 which are placed over the guide pins 22 on the periphery of the cylindrical member 12 in mounting the carrier 14.

Referring generally to FIG. 6, a portion of the periphery of the cylindrical member 12 including the stationary retaining pins 24 and the movable retaining pins 26 is shown. The stationary retaining pins 24 are attached to and are not movable with respect to the periphery of the cylindrical member 12. The movable retaining pins 26 are attached to a supporting block 28 located on the inside of the periphery of the cylindrical member 12. The supporting block 28 is held by means of a screw 42 which extends through a slot 44 formed in the periphery of the cylindrical member 12. The head of the screw 42 is of a diameter sufficient to prevent it from passing through the slot 44, but the shaft 45 of the screw is narrow enough to slide in the slot 44.

Referring generally to FIGS. 7-9, the supporting block 28 is a substantially rectangular block having formed therein a spring retaining hole 48. The block 28 further comprises a pair of pin mounting holes 50 used for mounting the movable retaining pins 26 and a tapped hole 51 adapted to receive the retaining screw 42. In this particular embodiment the block 28 is also provided with a hole 53 for the passage of light from a light source to a photocell within the cylindrical member 12 which is used in the timing system of the photocomposing machine to reset the picket counting mechanism at each revolution of the drum 10.

Referring generally to FIGS. 4 and 5, the periphery of the cylindrical member 12 comprises a plurality of longitudinal light transmitting slots 52 each comprises of a pair of semi-slots 52a and 52b separated by a support bar 53. A character carrier 14 will be mounted over each slot 52. The longitudinal slots 52 allow light to be transmitted from within the central portion of the cylindrical member 12 through the character carriers 14. Adjacent each longitudinal slot 52 is located a plurality of guide pins 22 to retain the character carriers 14 in position. At one end of each longitudinal slot 52 there is located a pair of stationary retaining pins 24 and at the other end there is located a pair of movable retaining pins 26. The movable retaining pins 26 extend from the supporting block 28 (shown in shadow) through a pair of guide holes 54. The retaining screw 42 extends

through a retaining screw slot 44 and into the supporting block 28, which it holds in place.

A collar 56 attached to the cylindrical member 12 is used to rotate the character drum 10 at high speed when the machine is in use. The collar 56 is mounted on the shaft of a drive mechanism (not shown).

Referring generally to FIG. 6 the supporting block 28 is mounted on the inside periphery of the cylindrical member 12. The movable retaining pins 26 extend through the guide holes 54 formed in the periphery of the cylindrical member 12. A coil spring 58 placed in the spring retaining hole 48 is held in place by a spring retaining pin 60. The spring retaining pin 60 is fitted into the spring retaining pin hole 62 in the periphery of the cylindrical member 12 thereby holding the coil spring 58 in place in the spring retaining hole 48.

The supporting block 28 is spring biased so the movable retaining pins 26 tend to move toward the stationary retaining pins 24. Mounting a character carrier 14 on the cylindrical member 12 is accomplished by placing the character carrier 14 on the periphery of the cylindrical member 12 with a pair of retaining holes 38 over the stationary pins 24. The character carrier 14 is lowered onto the cylindrical member 12 with its guide holes 40 over corresponding guide pins 22. The movable retaining pins 26 are aligned with the second set of retaining holes 38 by moving the block 28, increasing the tension on the spring 58. When the second pair of retaining holes 38 has been placed over the movable retaining pins 26, the block 28 may be released and the tension of the coil spring 58 will hold the character carrier 14 securely in place.

To release the character carrier 14 from the periphery of the cylindrical member 12 the movable retaining pins 26 are moved away from the supporting strip 34 by moving the block 28 allowing the character carrier 14 to be removed from the retaining pins 24, 26 which may be slipped through the retaining holes 38 at either end of the character carrier 14.

The present invention results in a number of advantages in the photocomposing art. The font strip 14 may be inexpensively made and simply mounted on character drum 10. Because the supporting block 28 is spring biased, the font strip 14 requires no moving parts and is economical to produce.

The structure of the character drum 10 with longitudinal light transmitting slots 52 provides support over which the font strip 14 is mounted. Because the font strip 14 is able to span a light transmitting slot 52 the font strip 14 remains fully supported by the character drum 10. Heretofore, font strips were either mounted with only one edge on the opaque drum or mounted over a transparent drum. Providing slots 52 in the drum 10 precludes any possibility of scratches or dirt which might be present on a transparent drum and which affect the image quality. At the same time the present structure retains the benefit attributed to support of the font strip 14.

The fact that the font strip 14 is fully supported allows the timing pickets 30 to be placed very close to the characters 32. This positioning of the timing pickets 30 and characters 32 prevents distortion and misalignment of type if the font strip 14 stretches in use.

The inventors have observed that it is advantageous to make the supporting block 28 as flat as possible in order to allow the photocell used for timing, i.e., picket counting, within the periphery of the cylindrical member 12 as close as possible to the timing pickets 30.

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Such positioning provides accurate character alignment.

Further accuracy of character alignment is provided in the present invention by forming the character 32 on the font strip 14 with a longitudinal base line. The advantage of having a longitudinal base line is that the type set by a photocomposing machine using the present invention will have a constant base line for an aesthetic appearance. Any slight inaccuracies in timing will not disrupt the base line of type set with the present invention.

It should be recognized by one skilled in the art that the embodiment herein described is provided by way of example only. It is evident that those skilled in the art may now make numerous uses and modifications of and departures from the inventive concepts. Consequently, the invention is to be construed as embracing each and every novel feature and novel combination of features present in or possessed by the apparatus and techniques herein disclosed and limited solely by the spirit and scope of the appended claims.

We claim:

1. A photocomposing machine comprising, in combination:

a. a rotatable character drum for presenting typographical characters in succession to an optical system for imaging onto a sensitized medium, said drum including a cylindrical member and means for guiding and removably retaining, on said cylindrical member at least one character carrier on which is arranged at least one font of said typographical characters, said guiding means including a plurality of guide pins disposed around and protruding from the periphery of said cylindrical member, and said retaining means comprising:

1. at least one stationary retaining pin rigidly attached to and protruding from the peripheral surface of said cylindrical member;
2. at least one movable retaining pin; and
3. pin mounting means for supporting said movable retaining pin on said cylindrical member, comprising:
 - i. a supporting block having said movable retaining pin rigidly attached thereto;
 - ii. means for holding said block to said cylindrical member while permitting sliding movement in the circumferential direction of said cylindrical member; and
 - iii. spring means for biasing said block tangentially to the peripheral surface of said cylindrical member, such that said movable retaining pin is urged in a circumferential direction away from the position of said stationary pin; and

b. at least one character carrier comprising:

1. a flexible band of material having disposed thereon two longitudinal successions of elements aligned in laterally displaced relation, the ele-

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ments of one longitudinal succession being typographical characters and the elements of the other longitudinal succession being timing marks,

said two longitudinal successions of elements being arranged substantially adjacent to each other along one side of said band of material and having an optical transmissivity opposite to that of the remaining portion of said band of material,

said band of material having a plurality of guide apertures, located adjacent and along said other side thereof, for receiving said guide pins of said character drum, and

said band of material having at least one retaining aperture, located at each end thereof, for receiving said stationary and said movable retaining pins, respectively; and

2. at least one rigid supporting strip adjacent said retaining aperture to prevent said band of material from turning.

2. The photocomposing machine of claim 1 further comprising a flash lamp within said cylindrical drum.

3. The photocomposing machine of claim 2, wherein said rotatable character drum is formed with a light transmitting slot in its peripheral surface over which said character carrier is mounted.

4. The photocomposing machine of claim 1, wherein said timing marks comprise a series of substantially parallel, rectangular marks arranged along the longitudinal axis of said character carrier.

5. The photocomposing machine of claim 4 further comprising electronic means for counting said timing marks comprising a light source on one side of said character carrier and a photocell on the other side of said character carrier.

6. The photocomposing machine of claim 1, wherein said flexible band of material comprises a photographic film.

7. The photocomposing machine of claim 1, wherein said typographical characters are arranged on said character carrier with a common base line extending along the longitudinal axis of said character carrier.

8. The photocomposing machine of claim 1, wherein said supporting block is slidably retained by support means extending through said peripheral surface of said cylindrical member.

9. The photocomposing machine of claim 8, wherein said supporting block is substantially flat.

10. The photocomposing machine of claim 9, wherein said support means comprises a screw which extends through a slot in the periphery of said drum, the head of said screw having a larger diameter and the shaft of said screw having a smaller diameter than the distance across said slot.

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