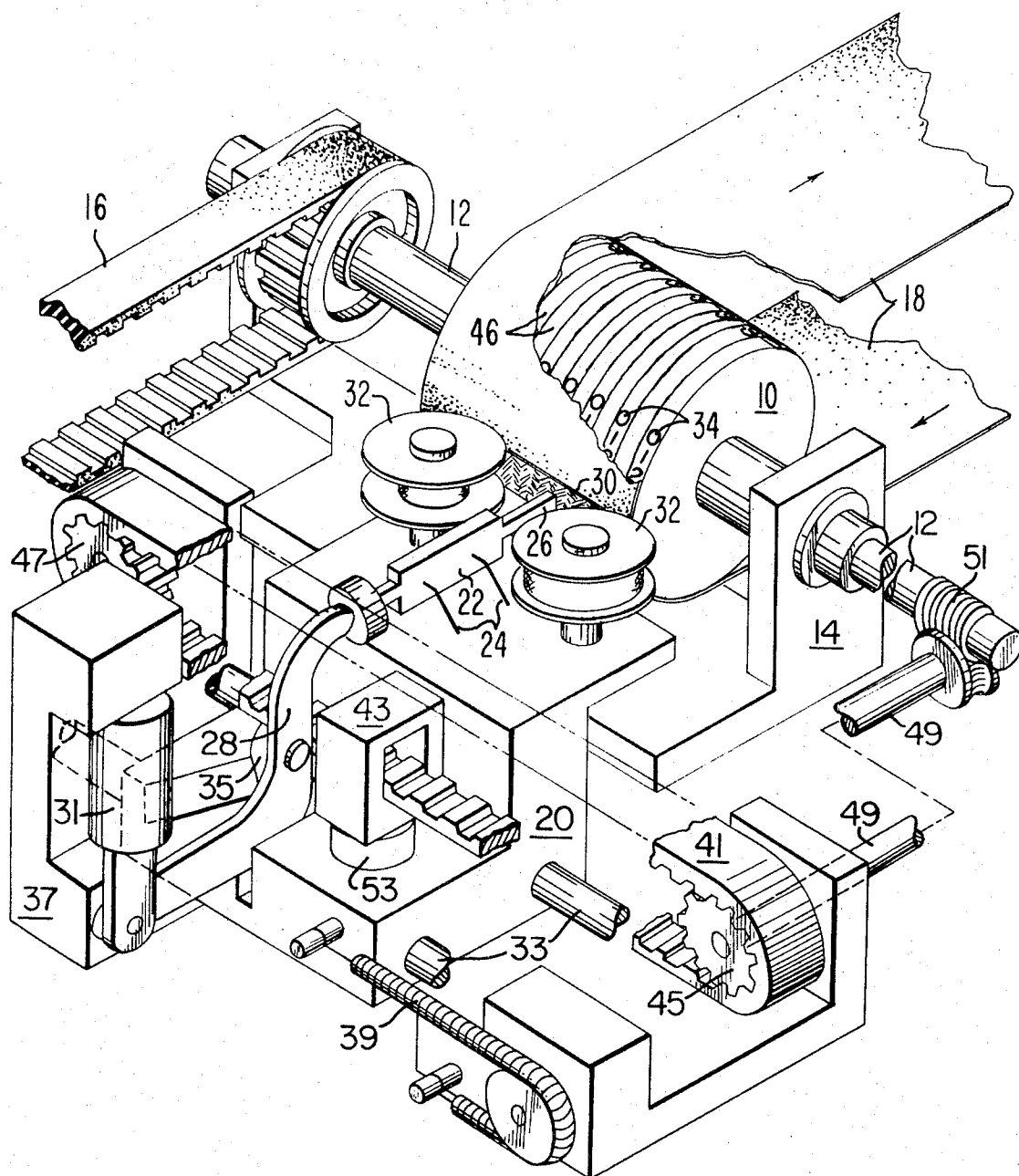


FIG. 1.



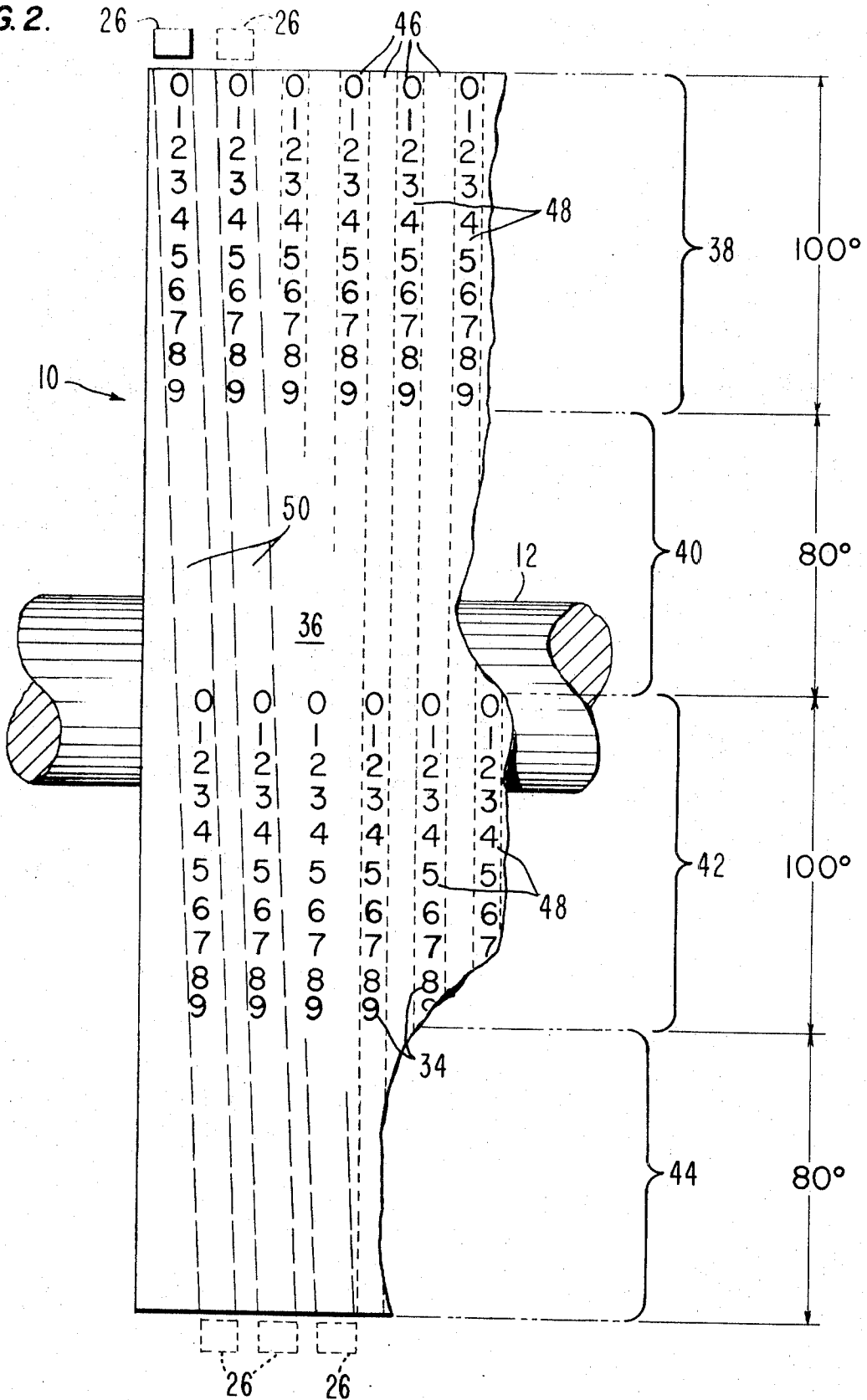
INVENTOR.

JOHN O. GRIGGS, JR.

BY *Ralston B. Parker*

ATTORNEY.

FIG. 2.



HIGH SPEED PRINT DRUM WITH TRAVELING PRINT HAMMER

BACKGROUND OF THE INVENTION

This invention is directed to that field of art pertaining to high speed printing apparatus having a type bearing drum which is continuously rotated in an axially fixed position and with which is associated a single print hammer movable axially of the drum in close proximity to the periphery thereof. More particularly, the invention is directed to the layout of the type characters on the drum and the relative speed of the continuous movement of the print hammer across the columns of the characters on the moving periphery of the drum to effect a desired multiple printing of characters during each revolution of the drum.

One known high speed printer of this general character located all of the type characters in a given sector of the drum occupying approximately half the circumference thereof and provided continuous lateral movement of the printer hammer so as to cover one horizontal printing spacing during each revolution of the drum. In another form of such printer, the print characters were arranged in alternately staggered groups located individually in alternate columns of the drum's periphery with the result that there was provided between each pair of adjacent character bearing columns an interposing column devoid of type characters. A consequent result of this drum layout was the printing of characters in a nonconventional widely spaced apart relationship to one another. In a third form of related printer the group of characters were individually located in offset relation to one another in adjacent columns of the drum's periphery but employed one or more fixedly positioned print hammers each having a head dimension sufficient to span at least two columns of the drum.

SUMMARY OF THE INVENTION

Certain distinctive advantages result from the present invention. By virtue of a particular layout of the type characters on the drum and a particular relationship of the velocity of the print hammer to the drum's periphery speed, it is possible to increase the printer speed by enabling the print hammer to print two characters during each revolution of the drum. This is accomplished by dividing the type drum into four angular portions or sectors, two of which contain circumferential rows of characters and the remaining two of which are devoid of type characters and are interposed between the first two sectors. Moreover, the groups of type characters are alternately staggered with respect to one another so that the groups in the odd numbered columns of the drum are in one type containing sector thereof and the groups of characters in the even numbered columns of the drum are in the other type containing sector thereof. In coacting with this drum layout, the single print impacting member is caused to travel across the columns of the drum at constant relatively high velocity and so as to cover two adjacent annular columns of the drum during each revolution thereof with a result that the print impacting member is capable of printing two characters during each revolution of the drum. The drum sectors of this invention which are devoid of type characters are utilized for providing return of the print impacting member preparatory to performing another printing operation.

The above listed objects, advantages and other meritorious aspects of the invention will be fully explained in the following detailed description. For a more complete understanding of the invention reference may be had to the following detailed description in conjunction with the drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of a high speed printer embodying the invention and partly broken away to expose the drum's periphery; and

FIG. 2 is a surface development of the periphery of the drum illustrated in FIG. 1 and showing the layout of the type characters thereon and the helicoidal band-path of the printing impacting member with reference to the rotating drum and the character groups thereon as the impacting member is continuously moved across the circumferential columns of the rotating drum.

DESCRIPTION OF A PREFERRED EMBODIMENT OF THE INVENTION

With reference to FIG. 1, a high speed printer constructed in accordance with this invention includes a type drum 10 secured to a shaft 12 which is continuously rotated on a frame such as that generally indicated at 14 by means of a driving belt 16 extending to a power source which may be an electric motor (not shown). A print receiving medium, such as a paper strip or web 18, is fed to the device and partially around the print drum 10.

A sidewise movable carriage generally indicated at 20 is disposed adjacent to the drum's periphery and carries operating elements cooperating with the type characters on the drum for making a visible impression of the characters on the record medium 18. The general organization of the carriage and the operation of its parts is chosen for purpose of example to be like that described in U. S. Pat. No. 3,472,352 of common ownership herewith. Accordingly, the print impression means carried by the carriage includes an elongated body or interposer 22 mounted in the carriage axial for translational movement on spring wire elements 24 projecting from opposite sides of the body. The end of the interposer adjacent to the drum is reduced cross sectionally to form an extension 26 serving as a print impact member or head. Pivotaly mounted on the outer portion of the carriage is a hammer 28 for applying a striking force on the interposer 22 to drive the same toward the drum in the manner described in the aforementioned patent. This action will cause the extension 26 to impact against an inking ribbon 30 and drive the latter and the recording medium 18 against a selected character of the rotating type drum, the ribbon and medium extending between the striker head 26 of the interposer and the drum for this purpose. As also disclosed in the aforesaid patent, the hammer 28 is operated in one direction by energization of a solenoid 52 carried 20 by the carriage and driven in the opposite direction by a spring means (not shown). The inking ribbon 30 may be mounted on a pair of spools 32—32 which in turn are supported by the carriage 20.

During a printing operation, the carriage 20 is bodily moved parallel to the axis of the drum and at a substantially constant speed. As disclosed in the aforesaid patent this is preferably accomplished by mounting the carriage for sliding movement on guide rods 33—33 and coupling the driving provisions of the carriage and

sufficient time for the hammer 28 and the interposer 22 to return and reset after performing a printing impression and before being presented with the next succeeding character group on the drum.

It should be understood that the invention is not limited to the particular illustrated embodiment. For example, it is possible to axially shift the drum instead of the print impression means, or move both, to achieve the relative motion therebetween. The ink ribbon, for example, may be fed through the apparatus in a different manner than that illustrated or even eliminated if the nature of the recording medium permits such.

While a particular embodiment of the invention has been shown and described, it will be understood, of course, that it is not desired that the invention be limited thereto since modifications may be made, and it is therefore contemplated by the appended claims to cover any such modifications as fall within the true spirit and scope of the invention.

What is claimed is:

1. A high speed printer apparatus for imprinting characters on a print receiving medium comprising in combination:

a cylindrical-type drum member having a plurality of annular columns on the periphery thereof, means to rotatably support the drum in a laterally fixed position,

means for rotating the drum about its axis, a print impacting member located in printed relation with respect to the drum and having a width that spans more than one said columns and less than two said columns,

a plurality of adjacent ones of said annular columns on the drum containing type characters, the characters of each said column being grouped with each group disposed over a sector of its associated column position and adjacent character groups being angularly displaced with respect to one another in different sectors of the periphery of the drum with alternate non-adjacent character groups being in substantial axial alignment,

means for continuously moving said print impacting member in a direction parallel to the axis of said drum at such a substantially constant velocity as to cover two adjacent annular columns of the drum during each revolution thereof, and

means for causing the print impacting member to strike said drum in response to a selected type character being disposed in printing position with respect to the impacting member while the impacting member is continuously moving at said substantially constant velocity.

2. The printer apparatus defined in claim 1 characterized in that sectors of the drum devoid of any type characters intervene between the character containing sectors of the drum and subtend angles approximating those of the latter.

3. The printer apparatus defined in claim 2 characterized in the groups of type characters contained within the plurality of adjacent columns are all of the same length and contain the same number of type characters.

4. A high speed serial printing device having a type drum, means for supporting said drum for rotation in an axially fixed position, said drum having a plurality of adjacent circumferential columns on the periphery thereof each containing a denominational order row of type characters and each row comprising all of the figures of an order, the type characters of each of said rows being spaced circumferentially according to a given pitch and said columns being spaced axially of the drum in accord with a desired print spacing, said device distinguished by embodying in combination;

a. a first drum sector which bears parallel rows of said type characters in the odd numbered columns of the drum,

b. a second drum sector which bears parallel rows of said type characters in the even numbered columns of the drum,

c. third and fourth drum sectors which are angularly disposed between said first and said second drum sectors and which are devoid of type characters,

d. means to rotate said drum continuously,

e. a single print impacting member having a striking face for individual character printing coaction with the individual type characters along a printing line parallel to the axis of the drum,

f. means for continuously moving said print impacting member along said printing line to traverse the different denominational rows of type characters successively at such a substantially constant velocity as to cover two adjacent columns of the drum during each revolution of the drum, and

means to operate said print impacting member when a selected type of any of said rows comes into printing range of the impacting member and while the impacting member is moving at said substantially constant velocity.

5. The printing device defined in claim 4 characterized in that the said third and fourth drum sectors subtend an angle approximately that of said first and second drum sectors.

* * * * *

[54] **CONSTANT FORCE SPRING CARRIER RETURN MECHANISM**

[75] Inventor: **Harry L. Wallace**, Garden City, Mich.

[73] Assignee: **Burroughs Corporation**, Detroit, Mich.

[22] Filed: **Nov. 2, 1970**

[21] Appl. No.: **86,120**

[52] U.S. Cl. **197/68, 197/64, 197/82, 197/183**

[51] Int. Cl. **B41j 19/72**

[58] Field of Search 197/48, 49, 62, 64, 197/65, 68, 82, 183, 60, 89, 91, 92, 93, 94, 95, 96; 101/93 C; 267/75, 109, 160, 162, 164, 178; 185/2, 9-14, 37-45

[56] **References Cited**

UNITED STATES PATENTS

3,334,719	8/1967	Howard	197/49
3,532,205	10/1970	Ozaki et al.	197/68 X
1,233,532	7/1917	Wilbur et al.	197/183 UX
3,138,988	6/1964	Herkt	267/160 X
2,803,034	8/1957	Fleming	267/178 X
618,910	2/1899	Seng	267/160
1,483,330	2/1924	Broman	197/68 X
2,172,000	9/1939	Wenker	267/160 UX
2,808,144	10/1957	Lambert et al.	197/183

2,873,016	2/1959	Hess	197/183
3,429,414	2/1969	Bradbury	197/49 X
3,599,772	8/1971	Comstock	197/49

FOREIGN PATENTS OR APPLICATIONS

878,132	6/1953	Germany	267/164
566,933	1/1945	Great Britain	267/164

Primary Examiner—Ernest T. Wright, Jr.

Attorney—Kenneth L. Miller and Edwin W. Uren

[57] **ABSTRACT**

Mechanism for biasing a carrier of a printing apparatus for yielding resisting movement thereof along a defined track extending parallel to a print line from a starting position and for returning the displaced carrier back to the starting position. A frame in the mechanism forms an elongated opening which serves as the track and guides an extension of the carrier for to and fro motion parallel to the print line. Carried by the frame is a pair of biasing members in the form of bowed coiled springs which engage the extension of the carrier and resiliently yield to tabulation of the carrier in one direction parallel to a print line and urge return of the carrier in the other direction to its starting position. A shock absorber is positioned in the track at the starting position for absorbing the inertia of the return movement of the carrier and permitting the carrier to overshoot the starting position as its inertia is absorbed.

9 Claims, 7 Drawing Figures

