United States Patent [19]

Roggensack

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[54] **PRINTING PLATEN**

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[73] Assignee: **Addmaster Corporation,** San Gabriel, Calif.

[22] Filed: **Apr. 18, 1974**

[21] Appl. No.: **461,997**

[52] **U.S. Cl.**..... **101/93.41;** 101/407 BP; 101/287; 197/144

[51] **Int. Cl.**[2]..... **B41J 11/18**

[58] **Field of Search**..... 101/95, 99, 110, 287, 316, 101/376, 379, 380, 3 R, 23, 31, 407 R, 407 BP, 407 A; 197/144, 147

[56] **References Cited**

UNITED STATES PATENTS

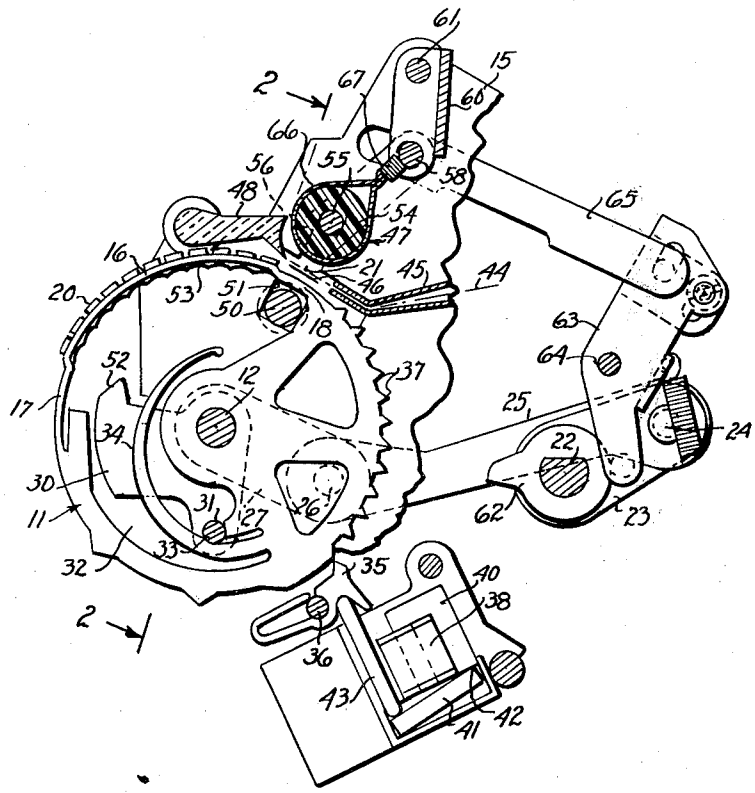
389,949	9/1888	Baker	101/23
1,801,396	4/1931	Thatcher	197/144 X
1,963,856	6/1934	Lewis et al.	197/144
2,073,209	3/1937	Heitman et al.	197/144 X
3,817,172	6/1974	Horton	101/31

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Assistant Examiner—Edward M. Coven
Attorney, Agent, or Firm—Fred N. Schwend

[57] **ABSTRACT**

A printing platen comprising a relatively soft elastomeric body and a thin sheet of relatively hard plastic or metal which is held taut against the surface of the body by spring pressure at the point where printing is to occur.

3 Claims, 4 Drawing Figures



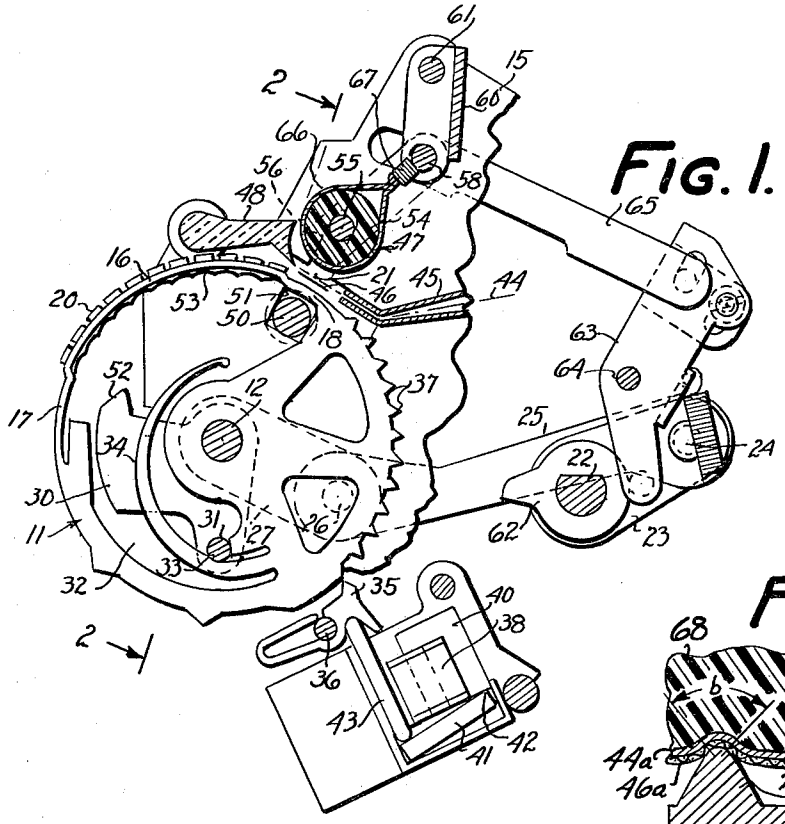


FIG. 1.

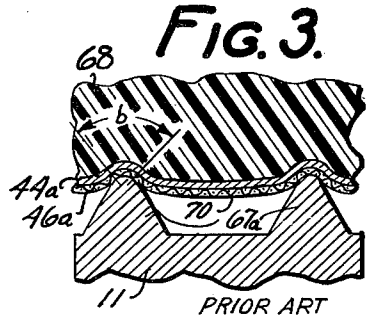


FIG. 3.

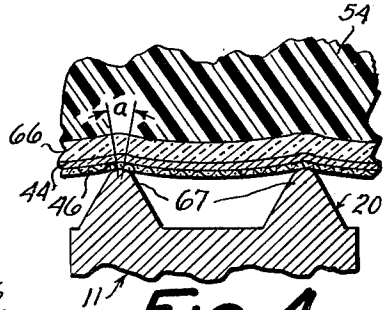


FIG. 4.

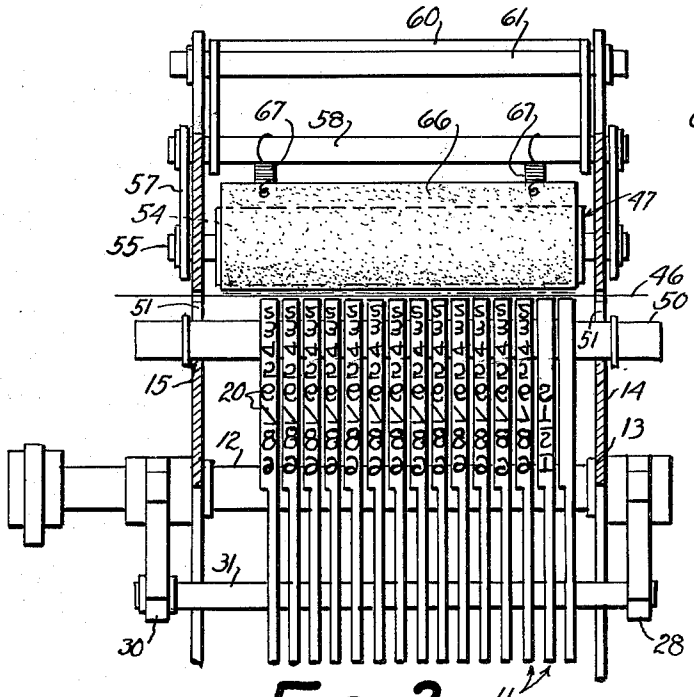


FIG. 2.

PRINTING PLATEN

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to the printing art and has particular reference to printing platens for transferring an imprint from a line of type characters onto a paper or like record medium.

2. Description of the Prior Art

Heretofore, printing platens for gang printers have been formed of elastomeric material, such as rubber, the material being soft enough to yield somewhat during the printing impression so that an even imprint can be obtained across the entire line of print even though minute inaccuracies might exist in the height of certain of the type characters due to manufacturing tolerances, etc.

Although such prior art printing platens are generally satisfactory, they tend to produce relatively wide and fuzzy character lines and also tend to smudge or form an undesirable background imprint of the printing ribbon, particularly between ajdacent type characters and over the interstices between the character lands of a single type character.

Attempts have been made to overcome the above defects by bonding a thin hard shell of plastic or the like in intimate contact with an underlying body of soft elastomeric material. For example, in the U.S. Pat. No. 1,801,396 to L. A. Thatcher a printing combination is disclosed comprising a thin walled shell of thermoplastic material which is secured over a relatively soft rubber body. The shell is nominally of a smaller inside diameter than the diameter of the body. It is first softened and then stretched to a larger diameter, and thereafter allowed to shrink into intimate contact with the body. Such construction is relatively costly and does not lend itself to mass production. Further, in the event of aging or wear of the shell due to extensive impacting by the type characters, it is difficult to replace the shell and would generally require replacement of the entire platen combination. In addition, any stretching of the plastic shell due to impact by the type characters or the like will cause the shell to break away from the rubber body.

STATEMENT OF THE INVENTION

A principal object of the present invention is to improve the quality of print in printers of the above noted type.

Another object is to overcome the aforementioned defects of prior printing platens.

According to the present invention, a thin stiffener sheet of relatively hard yet flexible material is stretched over the printing surface of a platen body which is formed of relatively soft elastomeric material and the sheet is held in intimate contact with the body by yieldable spring means.

Such stiffener sheet is continually held under a predetermined tension in contact with the platen body in spite of any slight change in dimensions of the body or the stiffener sheet which may be occasioned by aging or extensive impacting by the type members, or by ambient temperature changes.

Also, the stiffener sheet may be readily replaced without having to likewise replace or even dismantle the platen body.

BRIEF DESCRIPTION OF THE DRAWINGS

The manner in which the above and other objects of the invention are accomplished will be readily understood on reference to the following specification when read in conjunction with the accompanying drawing, wherein:

FIG. **1**, is a sectional elevational view of a printer embodying a preferred form of the present invention.

FIG. **2**, is a transverse sectional view of the printer and is taken along the line **2—2** of FIG. **1**.

FIG. **3**, is an enlarged fragmentary view illustrating the printing action of prior art platens.

FIG. **4**, is viewed similar to FIG. **3** but illustrating the printing action of a printing platen constructed in accordance with the present invention.

DESCRIPTION OF THE PREFERRED EMBODIMENT

The present invention is disclosed as embodied in the printer of the well known Addmaster electronic printing calculator. However, it should be understood that the invention may be equally well embodied in other types of printers.

Referring to the drawing, the printer disclosed therein comprises a plurality of plastic printing sectors **11** arranged in side-by-side relation and pivotally mounted independently on each other on a rockable support shaft **12**. The latter is rotatably supported in bearings **13** carried by spaced printer side frames **14** and **15**.

Each sector **11** has a somewhat flexible arcuate type section **16** which is integrally connected to the main body of the sector **11** by flexible end portions **17** and **18**. Printing type characters **20** ranging in value from "0" to "9" are spaced along the length of each type section **16**.

Means are provided to yieldably advance the various type sectors **11** clockwise from their illustrated home positions until differentially arrested in positions presenting selected type characters to a printing station **21**. After a printing impression, as will be described later, the sectors **11** are returned counterclockwise to their home positions.

For the purpose of moving the sectors **11**, a cyclically operable drive shaft **22** is suitably driven clockwise one revolution for each cycle of the printer. An arm **23** carried by shaft **22** is pivotally connected at **24** to a link **25** which, in turn, is connected at **26** to an arm **27** attached to the shaft **12**.

Arms **28** and **30** are fastened to the shaft **12** and carry the ends of a bail rod **31** which extends through openings **32** in the sectors **11** and frictionally engages depressions **33** formed in yieldable tails **34** formed integrally with the sectors **11**. As the drive shaft **22** and arm **23** move through the first half of a revolution, link **25** and arm **27** will rock the shaft **12** and thus carry the bail **33** through approximately 90° to yieldably drive the various sectors **11** accordingly.

Means provided to selectively arrest the different type sectors **11** so as to present selected type characters **20** at the printing station **21**. For this purpose, a stop pawl **35** is provided for each sector. The pawls **35** are independently pivoted on a rod **36** and are adapted to engage any of a plurality of spaced stop teeth **37** formed on the sector. The pawls **35** are moved into blocking relation with the stop teeth **37** by electromagnetic coils **38**. Each coil surrounds one leg of a U-

shaped magnet core **40**. Upon energization of a coil **38**, an iron armature **41**, pivoted at **42**, is attracted upwardly and in doing so forces a rod **43** to rock the associated pawl **35** into blocking engagement with whichever sector tooth **37** is next adjacent the pawl at the time the latter is actuated.

A paper tape **44** is guided through a guide channel **45** and extends between an inked ribbon **46** and a platen **47**. The tape **44** is deflected upwardly by a concave surface formed on a tear-off member **48**. Suitable line spacing means, not shown, is provided to push the paper **44** endwise through the channel **45** and on past the platen **47** as an incident to each printing operation.

A combined aligning and back-up bar **50** extends through the openings **32** in the sectors **11** and is guided for vertical movement in guide slots **51** formed in the side frames **14** and **15**.

Cam formations **52** are formed on the cam levers **28** and **30** and are arranged to engage the rod **50** after the various sectors **11** have been differentially arrested by the stop pawls **35** to cam the rod **50** upwardly into centering engagement with detent notches **53** formed in the type section **16** so as to accurately align the type characters **20** at the printing station **21**.

The printing platen **47** comprises a platen body **54** of relatively soft rubber or other elastomeric material, preferably having a hardness on the order of **30** to **35**, as measured on a Shore durometer (A scale). The body **54** is mounted on a platen shaft **55** which is guided at its ends for vertical movement in slots **56** formed in the side frames **14** and **15**. Links **57** are connected between the shaft **55** and a pivot rod **58** connected to a toggle bail **60** which, in turn, is pivotally supported on a rod **61** extending between the side frames **14** and **15**.

A cam **62** on drive shaft **22** is engageable with a cam follower **63** pivotally supported at **64** and connected by a link **65** to the pivot rod **58**. During a printing operation and while the detent rod **50** is in engagement with the type section **16**, the cam **62** actuates the toggle linkage to lower the platen **47** until it engages the tape **44** to transfer an imprint from the line of type characters **20** at the printing station, through the inked ribbon **46** and onto the paper tape.

According to the present invention, a sheet **66** of thin, hard thermoplastic material, such as is known in the art as "MYLAR", on the order of 0.010 inches thick, is wrapped around the platen body **54**, and is held taut in intimate contact with the lower surface of the body by a pair of tension springs **67** extending between the ends of the sheet **66** and the pivot bar **58**. It has been found that a metal stiffener sheet on the order of 0.008 to 0.010 inch thick may be used in lieu of a plastic sheet. In either case, such stiffener sheet has the characteristic that it strongly resists compound bending, that is, concurrent bending about intersecting axes and thus resists deformation into the interstices between adjacent type character lands **67**, FIG. **4**, forming the type characters **20**. Accordingly, the arc a, FIG. **4**, representing the area of direct contact between the ribbon **46** and the tips of the character lands **67** is relatively small and therefore a clear, crisp character line will be transmitted to the paper **44**. On the other hand, the stiffener sheet **66** and platen body **54** will readily accomodate any minor differences in height of the character lands **67** on a single type sector **16** due to manufacturing tolerances or other inaccuracies in manufacturing, so that an even print will be applied along the print line.

The above is in contrast to prior art platens, as exemplified in FIG. **3**, wherein a harder elastomeric platen **68**, generally of a Shore hardness of from 70 to 90 (A scale), is used to directly transfer an imprint from the type characters through an inked ribbon **46***a* to a paper tape **44***a*. Here, as the platen **68** is impressed against the paper tape it tends to deform, as shown at **70**, into the space between adjacent character lands **67***a*, resulting in a relatively large arc *b* of direct contact between the ribbon **46***a* and the tips of the character lands **67***a*, thereby transferring a relatively wide character line to the paper tape. Further, due to such deformation of the platen and paper between adjacent character lands, the paper and ribbon **46***a* are stretched, tending to transfer an undesirable background imprint between the ribbon and the paper along the print line.

I claim:

1. In a data printer,
means carrying printing type characters,
a printing platen extending over said type characters and normally spaced therefrom,
means for causing said platen and said type characters to impress a record medium therebetween,
said platen comprising a body of relatively soft elastomeric material,
a stiffener sheet of relatively hard flexible material extending over said body, and
means including a spring acting on said stiffener sheet for maintaining said stiffener sheet taut in intimate contact with a portion of said platen body against which said record medium is impressed.

2. In a data printer,
a plurality of type members arranged in side-by-side relation and carrying type characters,
a printing platen extending over said type characters and normally spaced therefrom, and
means for causing said platen and said type characters to impress a record medium therebetween,
said platen comprising a cylindrical body of relatively soft elastomeric material,
a stiffener sheet of relatively hard flexible material wrapped over the portion of said body which lies adjacent said type characters, and
means including a spring acting on said stiffener sheet for maintaining said sheet in intimate contact with said portion of said body.

3. In a data printer, a plurality of type members arranged in side-by-side relation and carrying type characters,
a printing platen extending over said type characters and normally spaced therefrom,
a toggle device comprising first and second link members;
said first link member being connected at one end to said platen,
a pivot member connecting said first link member at the opposite end thereof to one end of said second link member, and
means pivotally supporting the opposite end of said second link member;
means for actuating said toggle device to cause said platen to impress a record medium against said type characters,
said platen comprising a body of relatively soft elastomeric material,
a stiffener sheet of relatively hard flexible material wrapped around said platen body, and

spring means extending between said stiffener sheet and said pivot member for maintaining said stiffener sheet in intimate contact with said platen.

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