United States Patent [19]

Clary

[11] **3,878,779**

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[54] **SQUEEZE PRINTER**

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

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[21] Appl. No.: **414,089**

[52] **U.S. Cl.** **101/99**; 101/95; 101/93.21; 197/53; 197/55

[51] **Int. Cl.** **B41j 1/30**

[58] **Field of Search** ..... 101/93 C, 95, 96, 99, 110, 101/45; 197/18, 53, 54

[56] **References Cited**

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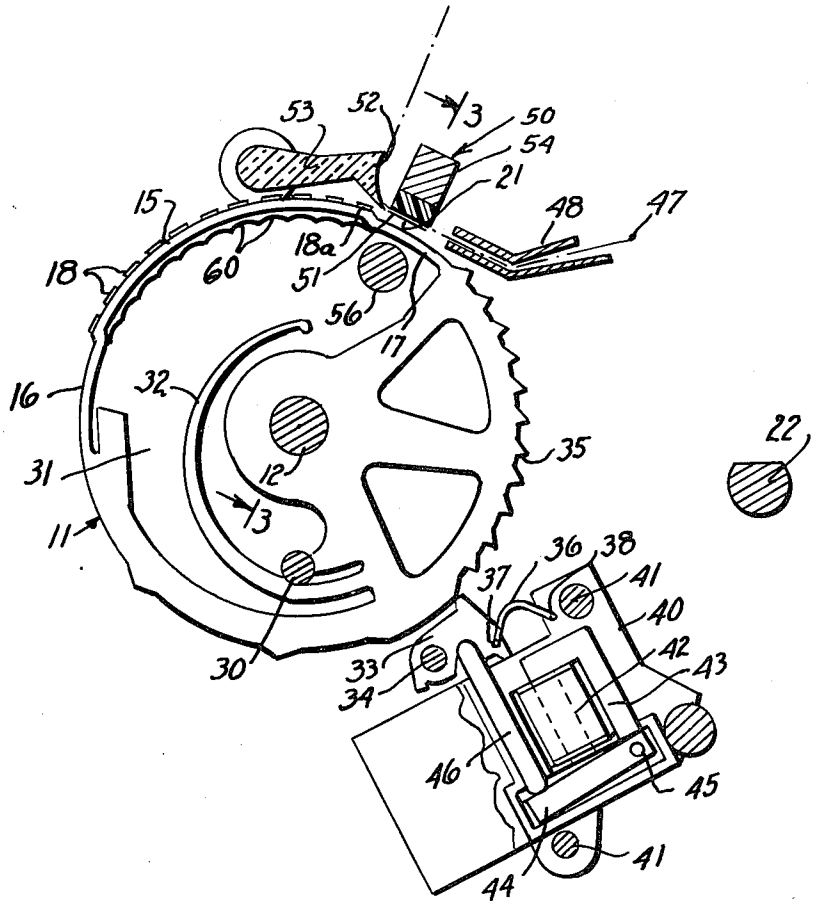
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Primary Examiner—Edgar S. Burr
Assistant Examiner—Edward M. Coven
Attorney, Agent, or Firm—Fred N. Schwend

[57] **ABSTRACT**

The rockable printing sectors of a printing mechanism are provided with arcuate outwardly yieldable type sections having detenting notches therein. After the sectors have been differentially set relative to a printing line, a combined aligning and printing member is moved outwardly to align the sectors and to thereafter flex the same sufficiently to impact and/or squeeze the type characters against a paper tape and printing platen.

4 Claims, 4 Drawing Figures



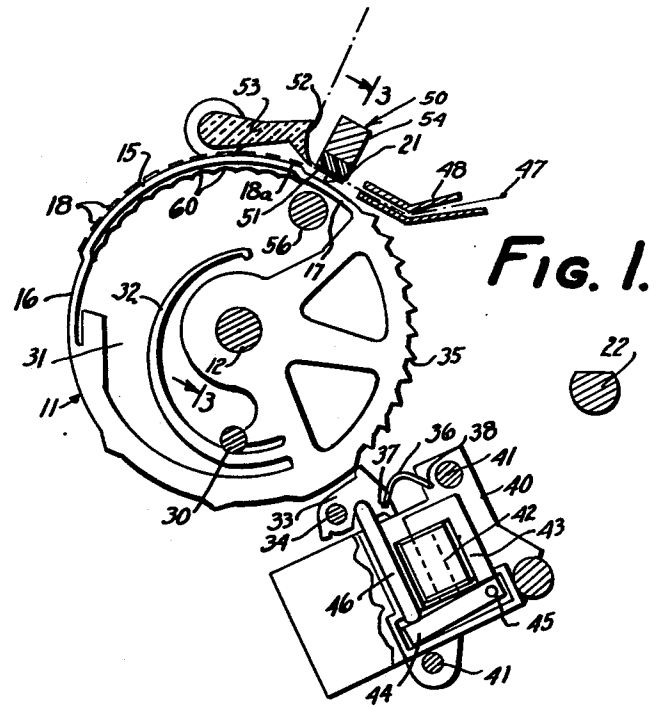
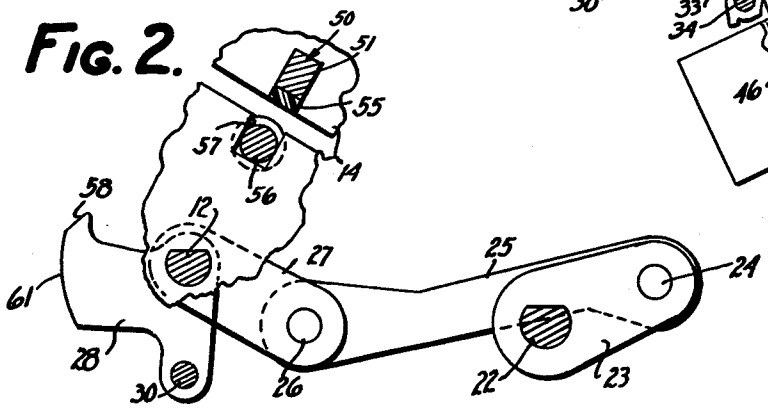


FIG. 1.

FIG. 2.



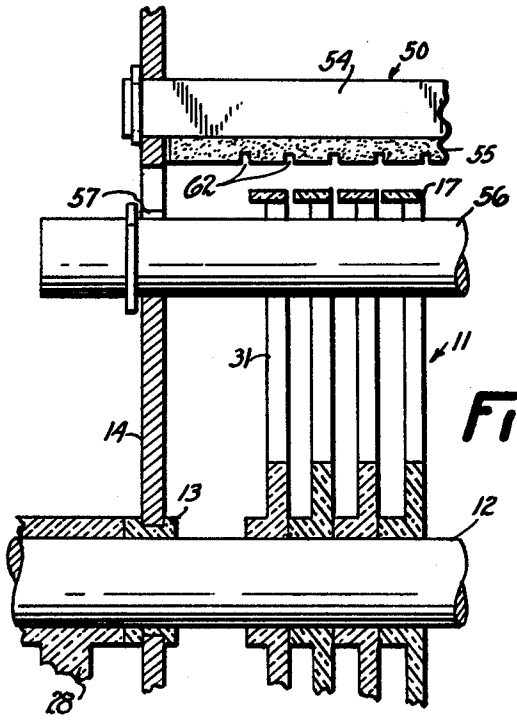


FIG. 3.

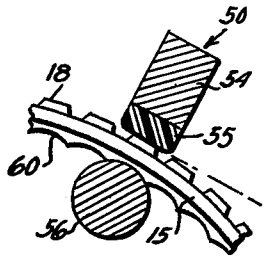


FIG. 4.

SQUEEZE PRINTER

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to data printing mechanisms and has particular reference to squeeze type printers.

2. Description of the Prior Art

Many data printers embody pivoted printing sectors or wheels arranged side-by-side. Type characters are spaced along the peripheries of such sectors against which a paper tape is imprinted, the particular characters being imprinted depending on the differential setting of the sectors. In order to properly align the selected type characters to be printed along a printing line, an alignment member is generally moved into engagement with spaced detenting formations or notches on the sectors after the latter have been set and prior to the imprinting action.

Heretofore, problems have been encountered in causing the alignment member to accurately align all the printing sectors due to minute variations in dimensions of the sectors and associated parts or due to necessary tolerances in such dimensions. For example, the alignment member may firmly seat in the detenting notches of certain of the sectors to accurately align the same but not properly seat in others, resulting in misalignment of the latter.

The above problem has been solved by the invention disclosed and claimed in my U.S. Pat. No. 3,621,777, issued on Nov. 23, 1971 by providing yieldable arcuate type sections on the sectors, these sections having detenting formations engageable by an aligning member which is movable radially outward from the sectors. The aligning member not only accurately aligns the type characters directly adjacent the printing line but also forms a solid base to support the type sections as print hammers are impelled toward the sectors. This construction enables relatively large tolerances and dimensional errors in the sectors and yet insures accurate alignment of the printed type characters.

The above noted printing mechanism works satisfactory. However, the printing hammers, upon striking the paper against the type sections create objectionable noise. Also, such printer requires a relatively large number of parts since a hammer and associated mechanism must be provided for each denominational order of the printer.

SUMMARY OF THE INVENTION

According to the present invention, a stationarily mounted printing platen is located directly above the yieldable type sections and after the sectors have been differentially set to selected type character positions, the aligner member is moved outwardly to first engage the detenting formations on the type sections to properly align the sectors. The aligning member is then further moved outwardly to flex the type sections sufficiently to imprint the paper against the printing platen.

The resulting printer greatly reduces the noise normally resulting from the printing operation and also reduces the number of parts required. Also, since print hammers and associated mechanism are eliminated, the printer can be made more compact and less expensive.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a sectional elevation view of a data printer embodying a preferred form of the present invention.

FIG. 2 is a sectional view illustrating the drive mechanism for the printing sectors and alignment bar.

FIG. 3 is an enlarged transverse sectional view through a part of the printer and is taken substantially along the line 3—3 of FIG. 1.

FIG. 4 is a fragmentary enlarged sectional view illustrating a type character impressed against a paper tape and stationary platen.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to the drawings, the printer disclosed therein comprises a plurality of plastic printing sectors arranged in side-by-side relation. The sectors are pivotally mounted independent of each other on a rockable support shaft **12** rotatably mounted in bearings **13** supported by spaced printer side frames, one of which is shown at **14.**

Each sector **11** has a somewhat flexible arcuate type section **15** which is integrally connected to the main body of the sector by end portions **16** and **17** of greater flexibility than that of the main part of the section **15.** Printing type characters **18** progressing in value from a zero type character **18*a*** are spaced along the length of each type section **15.**

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 **18** at a printing point **21.** After a printing impression, the sectors are returned counterclockwise to the home position. For this purpose, a cyclically operable drive shaft **22** is provided which 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 one end of a link **25** which, in turn, is pivotally connected at **26** to an arm **27** attached to the sector support shaft **12.**

Cam arms, one of which is shown at **28,** are fastened to the shaft **12** and carry the opposite ends of a bail rod **30** which extends through openings **31** in the sectors **11** and frictionally engages spring tails **32** formed integrally with the sectors. Thus, as the drive shaft **22** and arm **23** move through the first half of a revolution, link **25** and arm **27** rock the shaft **12** and therefore bail rod **30** through approximately 90° to yieldably drive the various sectors **11** correspondingly.

Means are provided to selectively arrest the different type sectors so as to present selected type characters **18** at the printing line **21.** For this purpose, a stop pawl **33** is provided for each sector. The pawls are independently pivoted on a rod **34** and are normally held out of blocking engagement with spaced stop teeth **35** on the sectors by compression toggle springs **36.** The latter are each pivoted at one end **37** to the associated pawl **33** and at the other end **38** to a solenoid housing **40** supported by frame rods **41.**

Electromagnetic coils **42** are mounted in the housings **40.** Each coil **42** surrounds one leg of a U-shaped magnet core **43.** Upon energization of a coil **42,** an armature **44** pivoted at **45** is attracted upwardly to the core and in so doing forces a rod **46** upward to rock the associated pawl into blocking relation with whichever sector tooth **35** is next adjacent the pawl at the time of energization.

A paper tape **47** is guided endwise through a guide channel **48,** between a stationary printing platen **50** and

an ink ribbon **51**, and is deflected upwardly by a concave guide surface **52** formed on a tear-off member **53**.

The printing platen **50** comprises a rigid bar **54** supported at its opposite ends by the printer frame plates, i.e., **14**, and has secured along the lower edge thereof a strip **55** of soft rubber or similar elastomeric material.

Suitable paper line spacing means (not shown) is provided to push the paper **47** endwise through channel **48** and past the platen **50** following each printing operation.

A combined aligning and printing bar **56** extends through the openings **31** in the sectors **11** and is guided for vertical movement, toward and away from the platen **50** in guide slots **57** formed in the printer side frames, i.e., **14**.

Cam formations **58** are formed on the cam levers, i.e., **28**, and are arranged to engage the rod **56** after the various sectors **11** have been differentially arrested by their stop pawls **33** to cam the rod **56** upwardly into centering engagement with detent notches **60** formed in the sectors **11**. Such notches are in radial alignment with respective ones of the type characters **18**. In centering the notches **60**, the bar **56** accurately aligns the type characters **18** at the printing line **21** regardless of any clearances or dimensional tolerances in the sectors and support shaft **12**. Thereafter, the rod **56** flexes the type sections **15** outwardly causing the selected type characters **18** to press upwardly against the printing ribbon **51**, paper tape **47** and platen **50** so as to transfer an imprint of such type characters onto the paper tape **47**.

The camming levers **28** each have a dwell portion **61** which is concentric with the shaft **12** to permit a small amount of overtravel of the levers **28** while the selected type characters are in printing contact with the paper tape **47**.

Preferably, the throw of bar **56** is such as to slightly overdrive the type characters into the relatively soft rubber strip **51** in order to insure an adequate imprint without requiring precision adjustment of the parts. Thus, the rubber tends to expand or bulge laterally between adjacent type characters and, in order to prevent this from interfering with the quality of print, grooves **62** are preferably formed in the strip **55** at locations intermediate adjacent sectors **11** to enable lateral expansion of one portion of the strip without effecting an adjacent portion.

In lieu of the stationary platen **50**, a stationarily located rotary platen roller capable of feeding the paper could be employed.

I claim:

1. A data printer comprising

a plurality of sectors arranged side-by-side and independently pivotal on a common axis,

arcuate sections extending concentrically of said axis and supported by said sectors,

said arcuate sections being flexible radially outwardly of said axis,

type characters spaced along the outer periphery of each of said arcuate sections,

detenting formations spaced along the inner periphery of each of said arcuate sections,

an elongated printing platen extending axially adjacent the type characters of all said arcuate sections at a fixed radial distance from said common axis,

means for guiding a record medium intermediate said printing platen and said sections,

means for differentially advancing said sectors independently of each other about said axis whereby to present certain of said type characters to said printing platen,

a single elongated aligning member extending under said arcuate sections and parallel to said axis, and

means for moving said aligning member radially outwardly from said axis whereby to engage overlying ones of said detenting formations to thereby index said type characters into axial alignment and also to flex said sections outwardly to impress said record medium against said printing platen.

2. A data printer as described in claim **1** wherein said detenting formations are radially aligned with respective ones of said type characters.

3. A data printer as described in claim **1** wherein said printing platen is stationary relative to said axis.

4. A data printer as described in claim **1** wherein said arcuate sections comprise

end portions having greater flexibility than the flexibility of the remaining portions of said sections.

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