Dec. 27, 1966 J. D. GEARHEART ET AL 3,294,212

PAPER LOADING DEVICE FOR DATA PRINTER

Filed March 4, 1965 2 Sheets-Sheet 1

FIG. 2

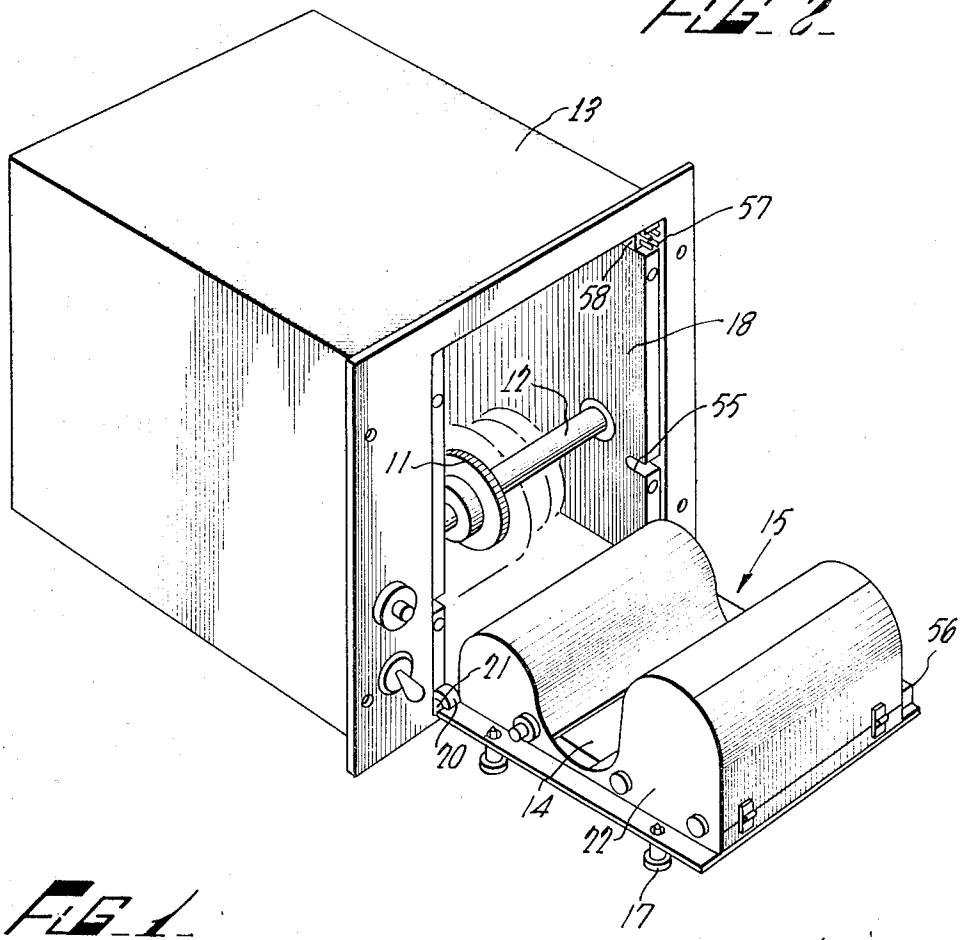
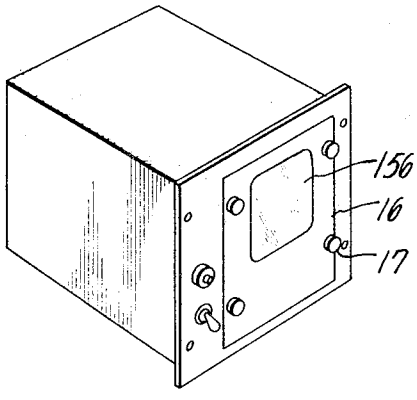


FIG. 1



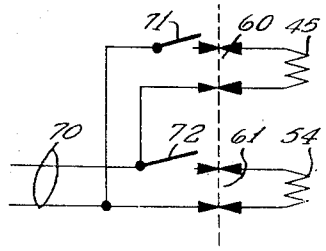


FIG. 3

INVENTORS.
JOHN D. GEARHEART
DONALD O. RASMUSSEN
BY
ATTORNEY.

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FIG. 3

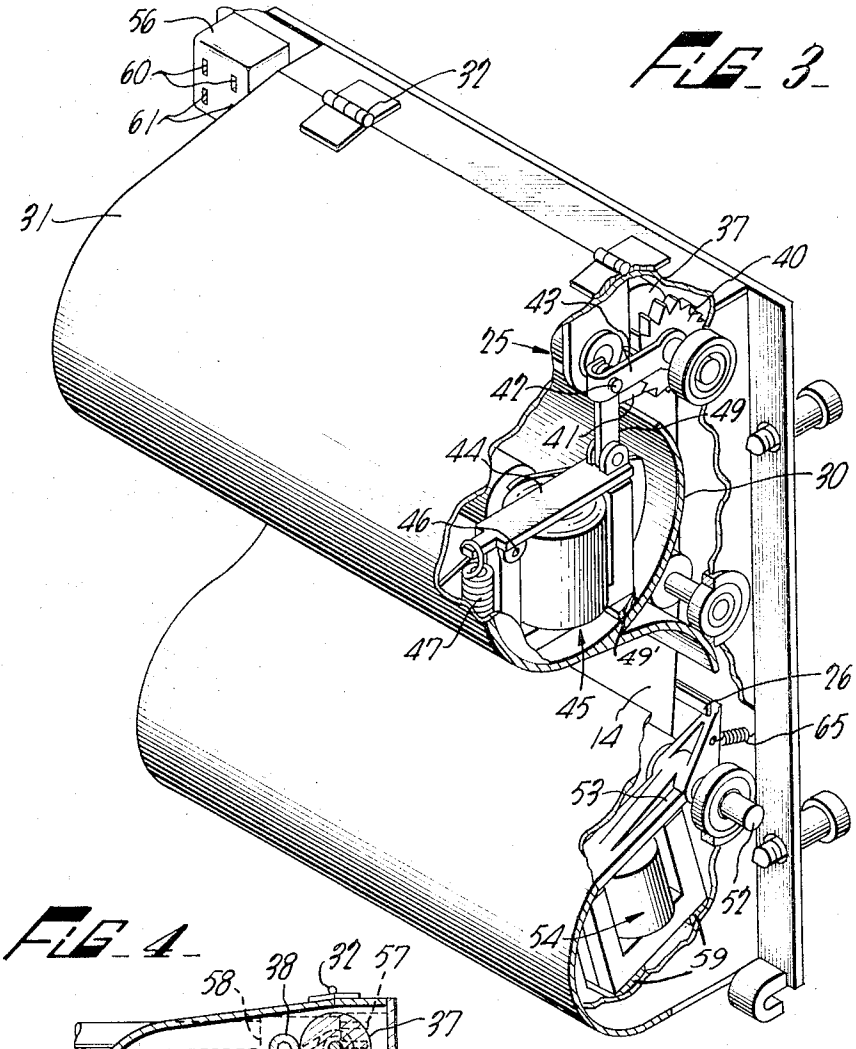


FIG. 4

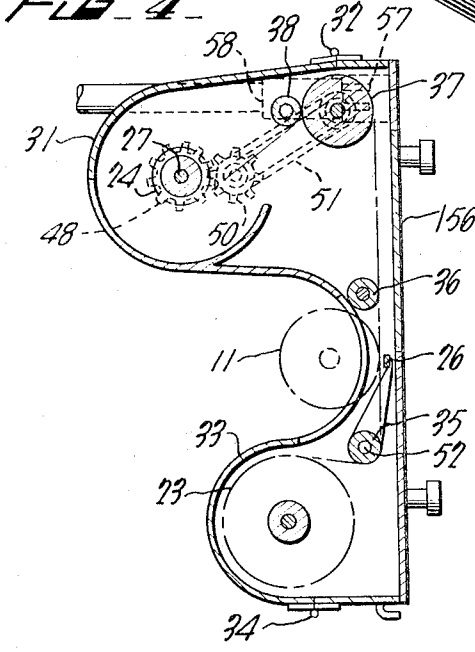
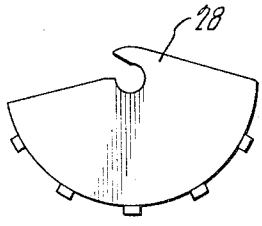


FIG. 5



INVENTORS.
JOHN D. GEARHEART
DONALD O. RASMUSSEN
BY
ATTORNEY.

United States Patent Office 3,294,212 Patented Dec. 27, 1966

3,294,212

PAPER LOADING DEVICE FOR DATA PRINTER

John D. Gearheart, Covina, and Donald O. Rasmussen, Arcadia, Calif., assignors to Clary Corporation, San Gabriel, Calif., a corporation of California

Filed Mar. 4, 1965, Ser. No. 437,216
2 Claims. (Cl. 197—133)

This invention relates to data printers and has particular reference to paper loading and advancing mechanism therefor, wherein the paper or other record medium may be readily replaced when exhausted.

In the installation of data printers in spacecraft, military aircraft, etc., for receiving messages from the ground or from other craft, the size and weight of such printers must necessarily be kept to a minimum, thus restricting the size of a roll or other supply of paper on which data is to be printed. On the other hand, in order not to lose the context of any message being received, it is necessary to readily and rapidly reload a new supply of paper under any abnormal or adverse environmental conditions which might be experienced at the time of reloading.

In certain cases, it may be necessary that the pilot or other person servicing the printer wear heavy gloves which would hamper normal threading of the paper through various paper guiding devices, etc., usually found in data printers.

Also, because of the many and varied duties imposed on a pilot or other personnel of a spacecraft or aircraft, the time which he may have available for performing the task of reloading paper may be extremely limited.

It therefore becomes a principal object of the present invention to provide means for quickly and readily reloading a paper or other record strip in a data printer of the above type.

Another object is to provide means for reloading a paper strip in a data printer under various adverse conditions.

Another object is to facilitate reloading of a paper strip in a data printer in a minimum amount of time on the part of a person servicing the printer.

Another object is to enable reloading of a paper strip in a data printer by a person wearing heavy gloves or in cases where finger dexterity may be below normal.

Another object is to provide a replaceable paper cartridge or module for data printers which does not require any mechanical connection to the printer mechanism other than the mounting means therefor.

Another object is to provide a compact but reliable replaceable paper cartridge for a data printer.

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 drawings, wherein:

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

FIG. 2 is a perspective view similar to FIG. 1 but illustrating the paper cartridge swung into an open position.

FIG. 3 is a perspective view of the paper cartridge with portions broken away to illustrate certain of the parts.

FIG. 4 is a sectional elevation view of the paper cartridge.

FIG. 5 is a front view of one of the bearing plates.

FIG. 6 is a schematic electrical diagram of the circuit for the paper strip mechanism and the printing hammer actuating mechanism.

Referring in detail to the drawings, the data printer comprises a type wheel **11** mounted on a shaft **12** rotatably mounted in bearings supported between side walls of a printer casing **13**.

A series of type characters are equally spaced around the periphery of the wheel **11** and means (not shown) are provided to rotate the type wheel to present selected type character to a print line. The type wheel is also shiftable laterally along the shaft **12** to effect printing in different character positions along the print line so as to record a line of print.

A paper strip **14** on which impression of selected type characters are imprinted is carried by a removable paper cartridge generally indicated at **15**. The latter comprises a wall member **16** adapted to be attached to the printer casing **13** by screws **17** so as to cover an opening **18** in the casing and to present a portion of the paper strip **14** in cooperative relation to the type wheel.

Hook-shaped lugs **20** are formed on opposite sides of the wall member and are arranged to pivot over studs **21** extending from the printer casing to permit the cartridge to be swung from open to closed positions and yet permit complete removal of the cartridge by lifting the same upwardly when in open position.

The cartridge includes two spaced side walls, one of which is shown at **22**, which are integral with the wall member **16** and which support various elements of the cartridge, including a supply roll **23**, a takeup roll **24**, a paper advance mechanism generally indicated at **25** and a printing hammer **26**.

The takeup roll **24** is mounted on a shaft **27** rotatably mounted at opposite ends thereof in bearings formed in bearing plates, one of which is shown at **28**, FIG. 5. The latter plates are suitably secured to an arcuate shroud **30** supported by the cartridge end plates.

A cover member **31** is pivotally supported at **32** to normally enclose the takeup roll to prevent paper lint, dust, etc., from falling from the paper onto the type wheel and other operating parts of the printer. A second cover **33** is pivotally supported at **34** to enclose the supply roll **23**.

The paper strip **14** extends from the supply roll **23**, over a guide roll **35**, past the type wheel **11**, over a second guide roll **36**, around a feed roll **37**, under a pressure roll **38** and onto the takeup roll **24**. The pressure roll **38** holds the paper by intimate contact with the feed roll over a sufficient angle of contact to insure proper driving of the paper by the feed roll.

Means are provided to intermittently advance the strip equal increments of movement following recording of lines of print. For this purpose, a ratchet wheel **40** is attached to one end of the feed roll **37** and is engaged by spring pressed pawl **41** pivoted at **42** on an arm **43** which, in turn, is pivotally supported for movement about the axis of the feed roll **37**. A link **49** is connected between the arm **43** and the armature **44** of an electromagnet generally indicated at **45**. The latter is supported from the adjacent side wall of the cartridge by brackets, one of which is shown at **49**. The armature is pivotally supported at **46** and is normally held in its illustrated rocked position by a tension spring **47**. Upon energization of the coil of the electromagnet **45** the armature **44** is drawn downwardly to advance the pawl **41** counterclockwise whereby to incrementally advance the paper strip from one print line to the next.

Means are provided for yieldably rotating the takeup roll upon advancement of the strip by the feed roll **37**. For this purpose, the takeup roll is provided with a gear **48** driven by a gear **50** which is entrained with the feed roller **37** by means of a belt **51**. The belt is wrapped over pulleys on the feed roller and on gear **50**. The belt is adapted to slip on the entrained pulleys whereby to compensate for changes in diameter of the roll **24** as it accumulates more and more of the strip **14**.

The paper strip **14** is preferably impregnated with a material which renders a visible imprint of a selected type character on the wheel **11** when struck against the latter by the hammer **26**.

The hammer **26** is in the form of a bail having arms at opposite ends thereof pivotally supported on a shaft **52** which also rotatably supports the paper guide roller **35**. One of the arms of the hammer extends rearwardly to form an armature **53** which cooperates with an electromagnet **54**. Electromagnet **54** is supported from the adjacent side wall of the cartridge by brackets **59**. When the coil of the latter armature is energized it will attract the armature **53**, thus swinging the hammer counterclockwise (as viewed in FIG. 4) against the action of a tension spring **65** to cause a printing impact against the type wheel.

In order to accurately align the cartridge **15** with the type wheel **11**, the shaft **52** is extended at opposite ends thereof to fit within locating slots **55** formed in the side walls of the casing **13**, when the cartridge is moved to closed position.

A window **156** is formed in the wall member **16**, permitting the last several lines of print to be viewed directly from outside the printer.

In order to facilitate installation and removal of the cartridge with a minimum amount of attention and as fast as possible, the coils of the electromagnets **45** and **54** are connected through electric conductors (not shown) to respective pairs of electrical sockets **60** and **61** provided by a connector member **56** which is attached to the wall member **16**. When the cartridge is swung into its closed position, the sockets **60** and **61** are engaged by respective electrical plugs **57** carried by a connector member **58** which is attached to one of the side walls of the printer casing. The plug members are electrically connected to certain electrical equipment (not shown) within the casing **13** including a power supply circuit **70** (FIG. 6) so that the electromagnets **45** and **54** may be operated by remote control through suitable switching devices, i.e. **71** and **72**, respectively.

It will be noted from the foregoing description that the cartridge may be easily and quickly removed and replaced with a minimum amount of attention. Thus, with the provision of two or more cartridges, one may be placed in operative position in the printer while the other may be threaded at one's leisure and be held in readiness to be inserted in position at a moment's notice.

Although the invention has been described in detail and certain specific terms and languages have been used, it is to be understood that the present disclosure is illustrative rather than restrictive and that changes and modifications may be made without departing from the spirit or scope of the invention as set forth in the claims appended hereto.

Having thus described the invention, what is desired to be secured by United States Letters Patent is:

1. Means for removably mounting a record strip in cooperative relation with a data printer having power transmission means and a rotatable type member carrying a plurality of type characters therearound,

comprising a cartridge having a wall member,

means for removably attaching said wall member to said printer,

said wall member having a window therein,

spaced strip supply and takeup rolls supported by said cartridge on opposite sides of said window,

means on said cartridge for guiding a record strip from said supply roll,

intermediate said type member and said window and onto said takeup roll,

means on said cartridge for advancing said strip in equal increments onto said takeup roll,

a hammer carried by said cartridge intermediate the path of said strip and said window for effecting an imprint of a selected one of said type characters onto said strip,

said hammer being located intermediate said rolls,

means carried by said cartridge for actuating said hammer, and

means responsive to attachment of said cartridge to said printer for connecting said power transmission means to said advancing means and said actuating means,

an imprint of said type character on said strip being visible through said window.

2. Means according to claim **1** wherein said power transmission means comprises an electric circuit, said strip advancing means comprises an electromagnetically operable device and said hammer actuating means comprises a second electromagnetic device.

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ROBERT E. PULFREY, *Primary Examiner.*

DAVID KLEIN, *Examiner.*

E. T. WRIGHT, *Assistant Examiner.*