Jan. 26, 1971 P. A. KALB 3,557,476

VIEWING DEVICE FOR MICROPRINT

Filed June 17, 1969 2 Sheets-Sheet 1

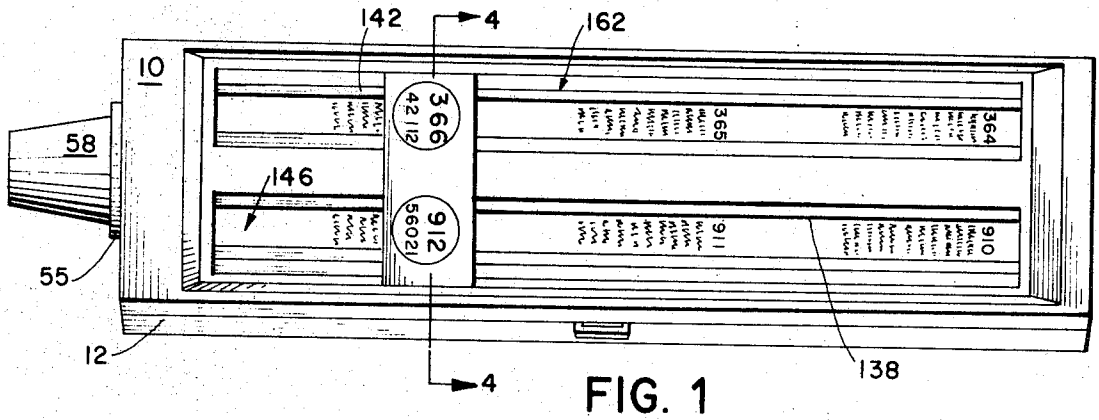


FIG. 1

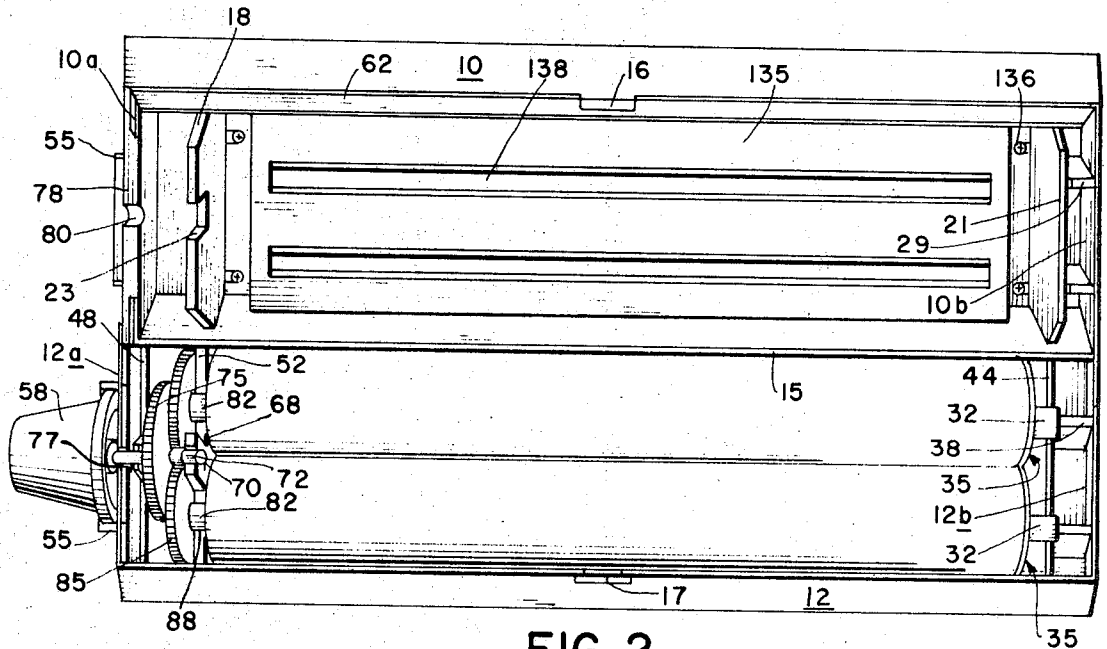


FIG. 2

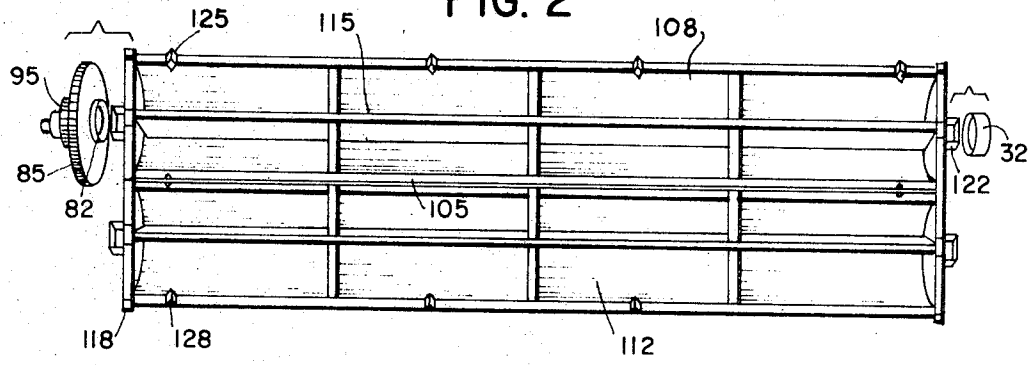


FIG. 3

INVENTOR.
PAUL A. KALB
BY Albert M. Zalkind

Jan. 26, 1971 P. A. KALB 3,557,476

VIEWING DEVICE FOR MICROPRINT

Filed June 17, 1969 2 Sheets-Sheet 2

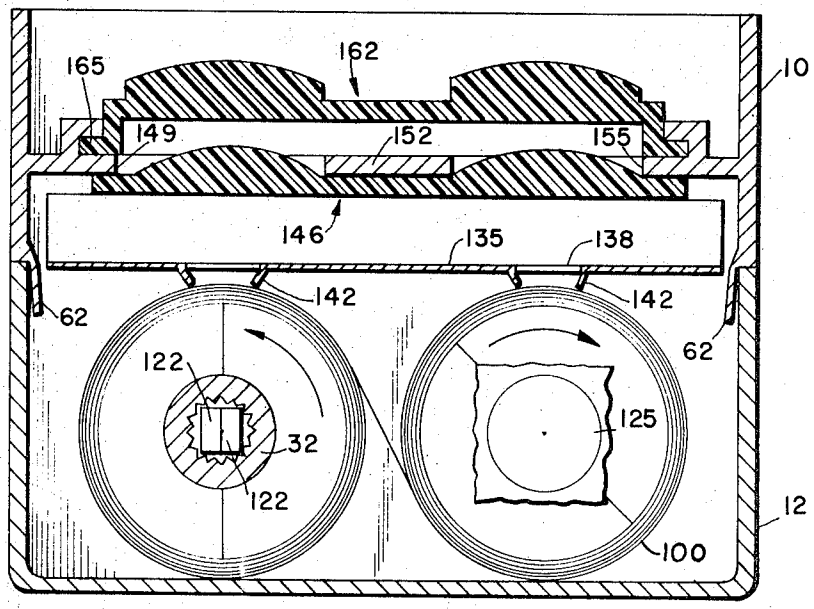


FIG. 4

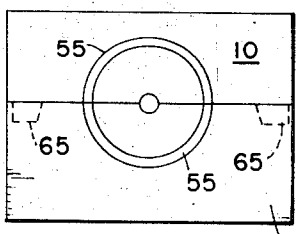


FIG. 5

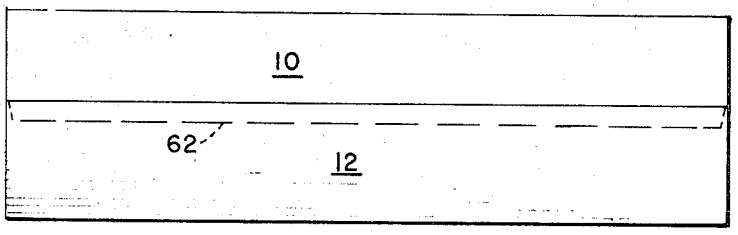


FIG. 6

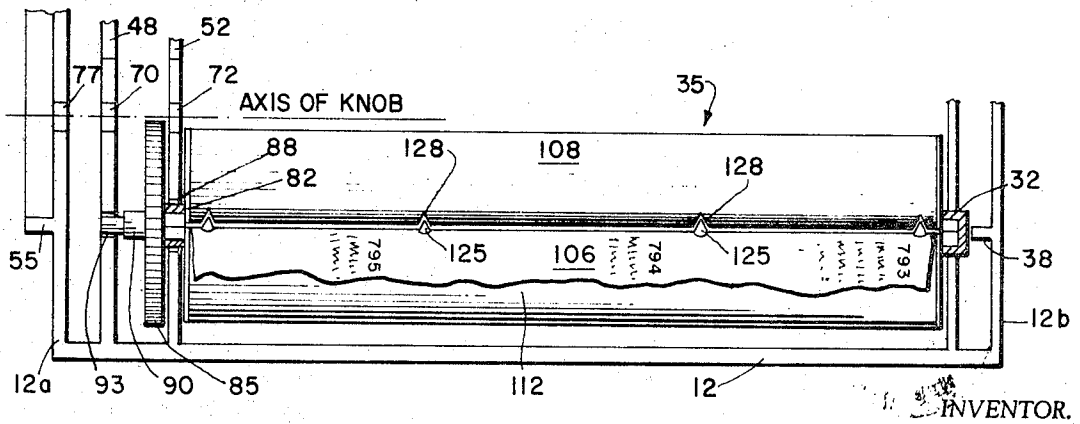


FIG. 7

INVENTOR.
PAUL A. KALB
BY

United States Patent Office 3,557,476 Patented Jan. 26, 1971

3,557,476

VIEWING DEVICE FOR MICROPRINT

Paul A. Kalb, Islip, N.Y., assignor to Pandick Press, Inc., New York, N.Y., a corporation of New York

Filed June 17, 1969, Ser. No. 834,061
Int. Cl. G09f 11/24
U.S. Cl. 40—95 8 Claims

ABSTRACT OF THE DISCLOSURE

The invention provides a compact device for storing many thousands of graphic characters, e.g., credit card numbers on a paper scroll microprinted on both X and Y axes, but wherein the compression is greater on the X axis so that a large number of columns of numbers can be printed on the scroll. By a combination of cylindrical and spherical lenses the micro-printed characters are made readily readable. The scroll is carried on manually rotated geared rollers which are particularly constructed to grip a respective edge of a printed scroll wrapped around the rollers and feeding reversibly from one to the other below the lens system. The structure further contemplates bearing support means comprised of open ended notches in walls of the housing to rotatively support the rollers and gearing and a manually rotative knob, all maintained in respective notches by gravity but readily removable for changing the paper scroll.

Briefly, the invention contemplates the provision of a housing or cabinet which encloses in a lower section a pair of geared rollers carrying a paper web or scroll which can reversibly wrap and unwrap on or from the rollers as they are rotated, to selectively expose elongated printed areas. An upper housing section carries a lens system positioned to magnify the selected exposed areas, the lens system comprising a respective cylindrical or bar lens fixed in position over each roller to expand the microprint on an X axis, and a respective spherical lens over each cylindrical lens which can be shifted to magnify local areas. The housing can be integrally molded of plastic as to both the upper and lower sections, which are hinged together. The housing sections are molded with all support necessary for rotation bearing support of the rollers and gearing and no machining or assembly work is needed except for addition of a slotted pressure plate, which may be metal or plastic, and which is carried by the upper section and which presses against the sides of the narrow areas of the scroll to be viewed, acting as viewing slots, a paper flattening device, and a friction drag to hold the rollers in selected position for reviewing the scroll.

Other objects and features of the invention will be apparent from the detailed description which follows, in-conjunction with the appended drawing in which;

FIG. 1 is a top view, in perspective, of the assembled invention;

FIG. 2 is a view similar to FIG. 1 with the upper housing section swinging open;

FIG. 3 is a perspective of a roller shown as a split cylinder with hinged halves opened and revealing gripping edges for clamping the end of the paper scroll;

FIG. 4 is an elevation in section through 4—4 of FIG. 1;

FIG. 5 is an end elevation of the assembled housing;

FIG. 6 is a side elevation thereof;

FIG. 7 is a fragmentary plan view, partially in section of the lower housing section.

FIG. 1 illustrates the cabinet arrangement which comprises an upper housing section **10** and a lower housing section **12** hinged at a hinge **15**. The housing members

may be integrally molded with the hinge formed of a thinned section so as to be flexible, thus eliminating the need for assembly with separate hinges. Such construction of plastic housings is well known. Molded latch elements **16** and **17** (FIG. 2) are provided.

The upper housing **10**, as shown in FIG. 2, has end walls **10***a* and**10***b* and contains a pair of spaced partitions **18** and **21** integrally molded with the housing wherein the partition **18** is provided with a notch **23** and is spaced from wall **10***a*. The partition wall **21** is spaced from the wall **10***b* and the spacing has ribs **29** having prolonged end portions which serve as stop members or roller locators for collars **32** which are bearing collars for rollers **35** located in the lower housing **12**. Thus the ribs **29** locate the right hand end of the rollers for maintainence against axial shifting to the right.

The lower housing **12** has end walls **12***a* and **12***b*. Co-acting with ribs **29** are additional molded ribs **38** transversely disposed between the end wall **12***b* and a partition wall **44** of the lower housing. The lower housing also has a pair of partition walls **48** and **52** which support the other end of the rollers and certain gearing to be described.

Each housing section has an external molded semicircular lip **55** on walls **10***a* and **12***a*, which, when the housing members are closed as shown in FIG. 1, provide rotative bearing support for a manually operable knob **58**.

In order to accurately locate the housing sections with respect to each other when the housing is closed, the upper housing has an inwardly offset longitudinal shoulder or rib **62** at each side and also short inwardly offset ribs **65** at each corner. (FIGS. 2, 5, 6). These ribs are suitably designed with taper so that when the upper housing member is swung downwardly it will be located precisely in exact position on the lower housing member to dispose the ribs **29** in proper spacing and alignment with the collars **32**, and will effect perfect registry of the semicircular ribs **55**, and will further bring the rib **18** directly in planar alignment with rib **52** so that the notch **23** will enclose a raised bearing support **68** on partition wall **52** which has a notch **70** for rotative bearing support for a shaft **72** integral with knob **58**. A gear **75** is keyed on shaft **72** which has further rotative support in the end wall **12***a*, in a notch **77** concentric with semicircular rib **55**. The end wall **10***a* of the upper housing likewise has a semicircular notch **80** which will enclose the upper portion of shaft **72**.

As shown in FIGS. 2 and 7, the left hand end of each roller is supported in a collar **82** integral with a gear **85**, each collar rotative in a notch **88** in partition wall **52** and also supporting a side of the respective gear. The two gears **85** are in constant mesh and these gears have respective shafts **90** on their opposite sides rotatively carried in respective notches **93** of partition wall **48**. One of the pinion gears **85** has an idle gear **95** (FIG. 3) integral therewith which will be understood to mesh with knob gear **75** so that rotation of the knob will cause rotation of the rollers in opposite directions (FIG. 4).

It should be particularly noted that the knob, all gearing, and the rollers can be lifted out of the lower housing since all bearing support is on walls having upper edges provided with the aforementioned notches which are open ended.

A paper scroll **100** which may be a continuous web of paper several feet long is secured at its end edges to respective rollers, in such a manner that rotation of the rollers (FIG. 4) causes the paper to move from the bottom of one roller to the top of another so that long, narrow upper areas of the paper on each roller become selectively visible as knob **58** is turned; such visibility is achieved through a lens system to be later described.

Referring to FIG. 3, each of the rollers **35** is made of two semicylindrical members which may be integrally molded with a thinned section **105** to effect a hinge line in a manner similar to the molding of the housing. Thus the semicircular members **108** and **112** suitably strengthened by internal ribs, such as **115** form a complete cylinder when brought together. The ends of each semicylindrical member are provided with flanges **118** which form a complete disc for paper web retention to insure proper tracking of the web as it is unwrapped from one roller and wrapped onto the other, there being several spiral layers thus handled.

Each of the roller halves is provided with a stub shaft **122** (FIGS. 3, 4, 7) of angular section such that when the roller is formed into a cylinder a square ended stub shaft is effected at each end and each such stub shaft at one end locks into a collar **32**, internally toothed, but circular on its exterior so as to be rotative in the notches in partition wall **44**. The collars **32** not only lock the right hand ends of the rollers but also coact with the ribs **29** and **38** to precisely locate that end of the rollers.

In a similar manner each gear **85** has an integral collar **82** for receiving and locking the respective assembled halves of the stub shafts of their respective rollers; collars **83** being similar to collars **32**.

Inasmuch as the gearing is very precisely located longitudinally of the housing by the mounting on the wall partitions **48** and **52**, the left ends of the rollers are accordingly precisely located. The length of the stub shafts is matched to the depth of the respective bearing collars to fully control end play.

The split rollers are thus fabricated in order to provide for a firm and precise gripping of respective ends of the paper web and this is achieved by molded teeth **125** spaced along the free edge of roller half **108** coacting with respective registering notches **128** of the free edge of roller half **112**. Accordingly, it will be understood that when the end margin of a paper web is placed between the free edges and the roller halves swung together and then locked in the collars **32** and **82** the teeth will dig through the paper and securely lock it due care being taken to align the paper so that it will wrap properly on the roller. Of course, the rollers, the collars, and the gearing are out of the lower housing at the time the ends of the paper web are thus secured. The paper can be substantially fully wrapped on one roller and then the other end gripped in the second roller whereupon the rollers with the paper carried thereon in the over-under relationship shown in FIG. 4 locked in the collars **32** and **82** and set into position in the lower housing member. Knob **58** is then put into place, all gears being thus in mesh position. The housing is then closed and the device is ready for use.

Referring to FIGS. 1, 2 and 4, a pressure plate **135** of thin flexible metal or plastic is carried as by end screws **136** in the upper housing member extending lengthwise and having slots **138** of a width to expose the topmost columns of the respective rollers as seen in FIG. 1. The edges of the slots are bent downwardly to form lips **142** for the length of the slots which lips bear lightly on the paper surface for the purpose of maintaining the respective exposed column areas fairly flat and even, and also to effect a certain amount of frictional drag on the web so that the rollers will hold position when turned to expose selected columns.

In order to provide many thousands of identifiable and discrete printed characters, which may be words or serial numbers, etc., etc., the paper **100** is microprinted in spaced columns (FIG. 1) running in the direction of the roller axis and such printing is extremely fine, being compressed in the X direction that is, transversely of the roller axis, whereby a maximum number of columns may be provided.

To expedite reading of graphic characters twin cylindrical lenses **146** are provided which may be an integral

molding of clear plastic and this is secured in position in the upper housing by being sandwiched between the pressure plate **135** and the spaced molded platform ribs **149**, **152** and **155** of the upper housing wherein the spacing between the ribs accommodates the cylindrically formed contours of the twin lens **146**. Such lens may be transversely located by abutment with the screws **136**, at all four corners. Thus, the cylindrical lenses will expand the compressed printing in the X direction for columns visible through respective slots **138**. However, the printing can be magnified in the X and Y directions by twin spherical lenses **162** likewise molded of clear plastic and arranged for longitudinal sliding in channels such as **165** molded above the platform ribs **149** and **155**. Accordingly, the cylindrical lenses expand the respective columns of the scroll portions directly therebelow for their entire length unidirectionally, and for localizing magnification of a desired portion of a column the lenses **162** are slidable providing general magnification at any selected relatively small area.

Thus the printed area for respective columns can be read under the circular lenses, line after line reading top to bottom or vice versa. However, the microprinting can be arranged in columns running the length of the web rather than the width, if desired. Likewise, the direction of compression can be top to bottom of the printed characters, in which case the sequence of columnar printing would extend in the direction of the length of the web.

What is claimed is:

1. A device of the class described comprising a housing;
a pair of rollers rotatively carried by said housing and having respective roller gears meshing with each other;
and a manually rotative knob rotatively supported by said housing;
said knob having a knob gear rotative therewith; a pinion gear rotatively secured to one of said roller gears and meshing with said knob gear;
whereby rotation of said knob effects rotation in opposite directions of said rollers;
a paper scroll having respective ends secured to said rollers and wrapped therearound so as to move from the top of one roller to the bottom of the other as said rollers are rotated;
said housing having bearing support means for said rollers and for said knob comprising walls having open ended notches at their upper edges to support said rollers and knob;
whereby said rollers, knob, and gears are removable from said housing.

2. A device as set forth in claim **1**, said bearing support means comprising a wall having a pair of notches; said rollers having shafts;
each said roller gear having an integral collar insertable in respective notches for rotative support;
a shaft at each end of said rollers and being disposed in and keyed in a respective collar.

3. A device as set forth in claim **2**, at least one said roller being comprised of partial cylindrical members having coacting edges provided with gripping means to grip the respective end of said scroll when said members are assembled to effect a complete roller.

4. A device of the class described, comprising a pair of rollers and rotative support means therefor; each roller being comprised of a pair of members having scroll gripping means for gripping respective ends of a scroll wound on said rollers when said members of each roller are held in respective assembly whereby a scroll is rollable back and fourth therebetween when said rollers are rotated; and means for maintaining the members of each roller assembled in respective scroll gripping assembly comprising rotatively driven elements on said members at one end thereof and actuatable rotative drive means keyedly and lockingly engaging said driven elements to maintain assembly of respective rollers for gripping said edges on

respective ends of said scroll and to be actuated to rotatively drive said rollers.

5. A device as set forth in claim 4, said driven elements being a stub shaft disposed on each roller member and said drive means comprising collars encompassing the stub shafts of each roller; respective gears integral with said collars and meshing with each other and means for manually driving one of said gears.

6. A device as set forth in claim 4,

a flexible pressure plate carried by said upper housing having slots extending over said portions for visibility thereof;

and having means engageable with the surface of said scroll to effect flattening of said portions and frictional drag thereon.

7. A device of the class described comprising upper and lower housings and means for securing said housings in superimposed position;

said lower housing having bearing support means for a pair of rollers having gearing drive means;

and said gearing drive means comprising a manually rotative knob disposed externally of said lower housing;

said bearing support means comprising walls of said lower housing and having open ended notches for rotative support of said rollers and gearing drive means;

a lens system carried by said upper housing;

a scroll carried by said rollers and having a visible portion over each roller;

said lens system being registerable with said scroll portions when said housings are assembled.

8. A device of the class described comprising housing means;

said housing means supporting a pair of rollers therein and means for simultaneously driving said rollers;

said housing means having means for viewing a visible portion of said scroll over each roller;

a flexible pressure means within said housing means having slot means extending over the visible scroll portions for effecting visibility thereof and being engageable with said scroll to effect flattening of said portions and frictional drag on said scroll.

References Cited

UNITED STATES PATENTS

1,346,995	7/1920	Toland	40—86
1,749,933	3/1930	Barnett	40—86X
2,876,559	3/1959	Sloan	40—86X

JEROME SCHNALL, Primary Examiner

L. R. OREMLAND, Assistant Examiner

U.S. Cl. X.R.

40—86