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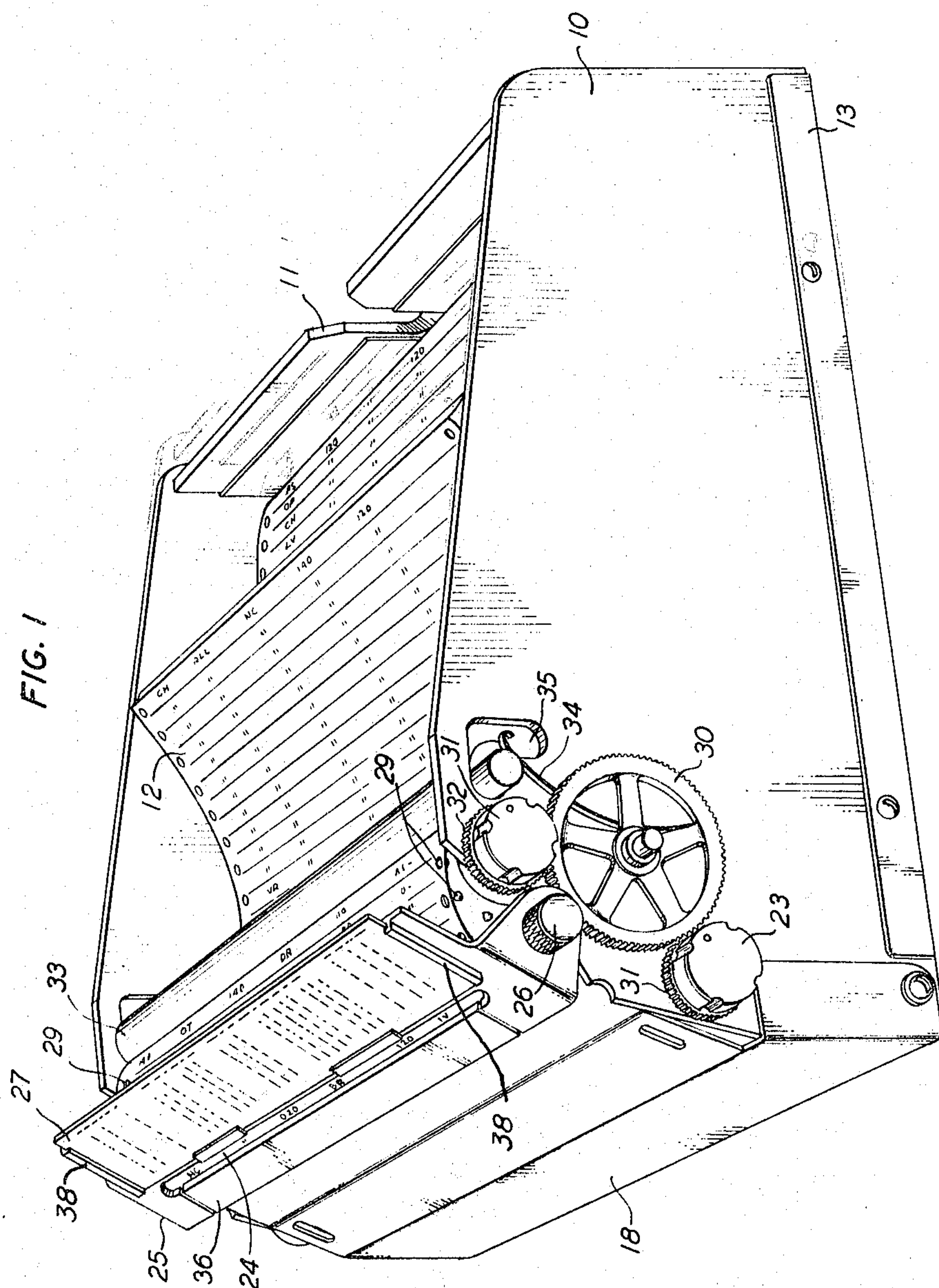
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3,307,762

SINGLE LINE PRINTOUT READER FOR COMPUTER SHEETS

Filed Nov. 12, 1964

2 Sheets-Sheet 1



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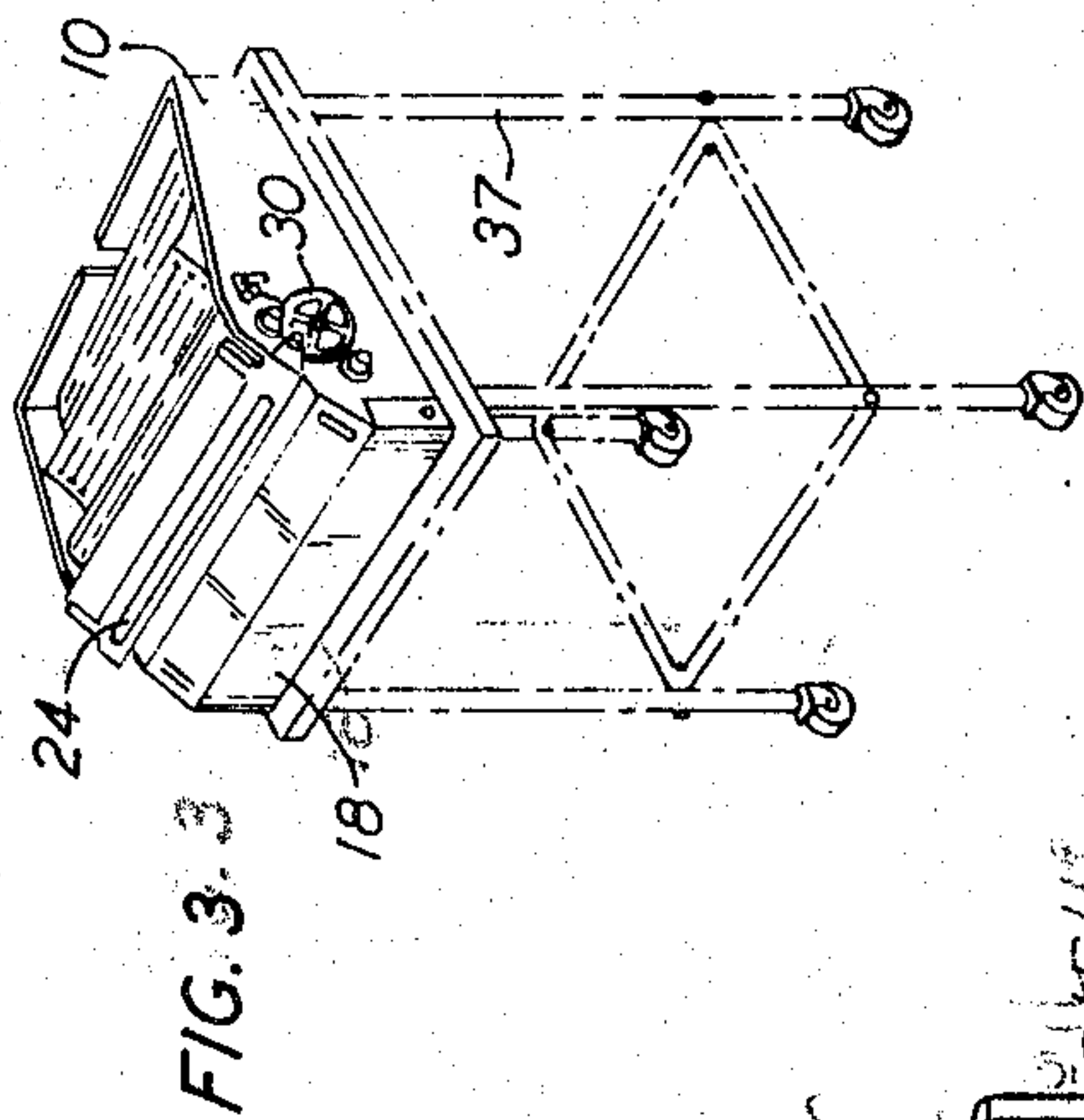
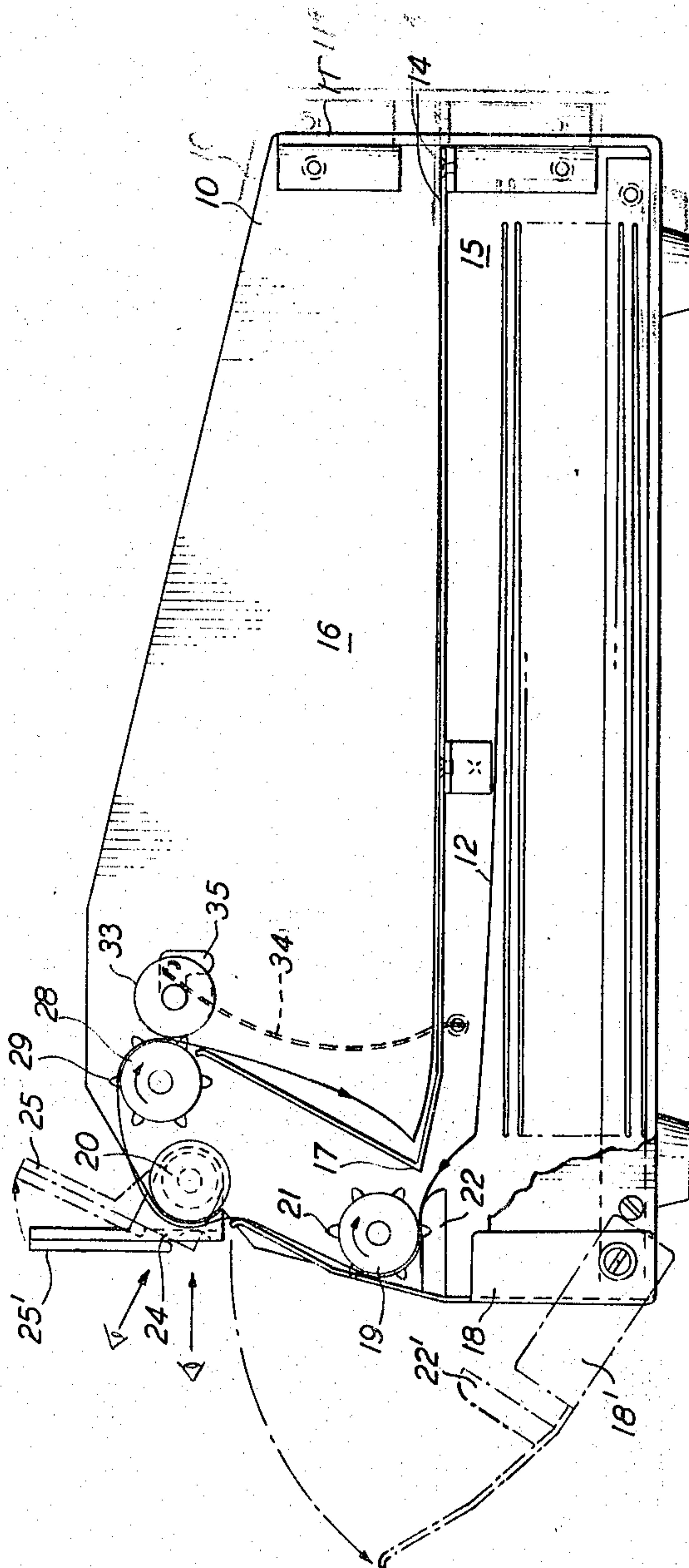


FIG. 2



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SINGLE LINE PRINTOUT READER FOR COMPUTER SHEETS

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This invention relates to the display of selected portions of material written on large sheets of continuous stationery, and more particularly to apparatus for exhibiting a single line of printed computer data at a time.

Many modern digital computers issue their output information in printed form on relatively wide sheets of paper folded in a zigzag or fanfold fashion. Printed sheets of this sort, which may be provided with sprocket holes along one or both edges and which are generally referred to as "computer printouts," find a wide variety of uses. For example, the specification of the wiring of a complex electrical system may be generated in a computer and made available in the form of a listing on a printout sheet. The sheet serves as a wiring run list for a technician who follows, one line at a time, the instructions in order to assemble the system. Necessarily, the wireman must complete the instructions on one line before starting the next. Inadvertent wandering from one line to the next must be avoided. However, because of the extreme length of the sheet, the relatively small printed character size, and the fanfold arrangement of the sheets, selective viewing becomes difficult. Further, stacks of printout sheets are cumbersome and, during a lengthy wiring operation, may become both unruly for the operator to handle and mutilated so that further use of the sheets is impaired.

Although apparatus is available for transporting fanfold continuous stationery from one location to another by way of sprocket drive arrangements, such apparatus is cumbersome and fails to provide the necessary taut guiding required for convenient observations of individual printed lines. It is customary in such apparatus to withdraw the printout from a stack in a relatively open container and to deposit it in another relatively open bin. Both containers must be sufficiently large to accommodate the "ballooning" of the sheets between folds as they are unfolded and allowed to refold as they drop into the lower repository. Considerable difficulty is encountered if an attempt is made to withdraw the material from a relatively small container and deposit it in an equally small enclosed container. Since printout or readout generally takes place at machine speed, and human intervention is ordinarily unnecessary, no provision is made in such printout transport mechanisms for viewing or for slow speed advance and return.

According to the present invention, these difficulties are overcome by means of a compact display unit which stores computer printout material, displays it one line at a time and refolds it for storage. A stack of fanfolded computer printout material is placed in a relatively small bin and drawn by way of a series of spaced elongated rollers past a narrow window and thereafter deposited in another bin in folded fashion. The window accommodates one line only and provision is made for advancing the printout sheet one line at a time past the window. Provision is made for moving the window to any desired viewing angle, and to permit adjacent lines of material to

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be momentarily examined. Auxiliary instructions may be posted adjacent the window as required.

To prevent bunching as the paper is withdrawn from the primary storage bin, an abrasive guide bar is urged against the entire width of the paper both to supply drag and to guide the paper toward the lower of two synchronous drive rollers. Such a guide is effective to assure smooth passage of an extremely wide sheet past the viewing window. An auxiliary roller in close proximity to the upper drive roller is urged against the outgoing sheet to direct it toward a card guide acutely angled between the direction of approach of the paper and the floor of the receptacle bin. Advantageously, the auxiliary roller engages the printout sheet across its entire width so that bunching as the sheet leaves the arcuate guide path is prevented.

The primary drive rollers are linked together for synchronous rotation. Each roller is provided with a series of circumferentially placed pins at each end for engagement with the sprocket holes in the printout stationery. Accordingly, the printout material may be advanced in either the forward or reverse directions by actuating either one of the rollers or the synchronizing coupler manually, by external mechanical means, or by electrical drive means. Suitable detent apparatus is employed to make it easy for an operator to advance the printout sheet one printed line at a time.

Because of the compact structure of the printout reader of the present invention, the device may be supported on a portable dolly, a pedestal or secured, for example, to a ladder or relay rack so that it may be conveniently placed near the operator. If desired, the window may be illuminated from the rear to enhance visibility of the printed material.

The invention will be fully apprehended from the following detailed description of an illustrative embodiment thereof taken in conjunction with the appended drawings, in which:

FIG. 1 is a perspective view of apparatus for exhibiting a single line of printed computer data at a time in accordance with the invention;

FIG. 2 is a simplified schematic drawing of the construction of the apparatus of FIG. 1; and

FIG. 3 illustrates the manner in which the printout reader of the present invention may be supported for use.

FIG. 1 shows a perspective view of the external appearance of the single line printout reader of the invention and FIG. 2 shows a cutaway view of its internal arrangement. The same numeral designations are used for the parts visible in each view of the reader, and advantageously both figures may be consulted together in the following description of its construction and operation.

The containers for holding long computer printout sheets or other continuous stationery and the means for withdrawing it from one receptacle, drawing it past a viewing window, and depositing it in a second receptacle are contained in a compact case 10 which may be of any desired external configuration and which may be fabricated of any suitable material, such as sheet aluminum or plastic. For convenience, the rear side 11 may be hinged so that it may be lowered in order to facilitate loading of computer printouts 12 and the withdrawal of them after use. Bottom plate 13 similarly is affixed to the case in a fashion such that it may be removed as desired. A deck 14 separates a lower receptacle or bin 15 from an upper receptacle 16. It has at its forward end an acutely angled guide portion 17 which extends upward to form the front

wall of bin 16. Preferably, deck 14 and guide 17 extend the entire width of case 10. If desired, guide 17 may be a separate piece attached to the case in abutting relation to deck 14. In practice, it has been found that a single member is somewhat easier to fabricate.

The front of case 10 is covered by means of a hinged panel 18, shown in two of its positions in FIG. 2 (18 and 18'). During the loading operation, the panel may be withdrawn from the front of the case to permit threading a printout sheet from lower container 15, over drive roller 19, which is provided with sprocket holes 21 at each end, and over idler 20. Panel 18, in addition, supports elongated blade-like guide member 22 which is positioned between the sprocket pins of roller 19 and which has its upper surface roughened or faced an abrasive substance. The guide is positioned so that in the closed position of panel 18 it is in close proximity to roller 19 at all points between sprocket pins 21. Guide member 22 thus provides a confined path for paper 12 as it emerges from container 15 and assures that it follows the prescribed path towards idler 20. Bunching of the paper as it unfolds in container 15 i.e., unfolds between each crease in the paper, and the accompanying ballooning consequently does not cause a loss of contact of the paper with drive roller 19. Drive roller 19 is supplied with an external drive knob 23 (and if desired a corresponding knob on the other side of the case), and with suitable detent means (not visible but of any desired construction) for permitting the roller to be manually rotated through a predetermined angle in order to advance the paper.

As the paper passes over idler 20, it is visible to a viewer in front of the reader by way of a narrow window 24 in movable window support 25. Support 25 is affixed to case 10 by means of pins and a pair of knurled knobs 26, only one of which is visible in FIG. 1. Preferably, guide 25 is supported on the axial support used for idler 20. The guide may be rotated by loosening knobs 26 in order to move it through an arc of approximately 45 degrees so that any one of a number of individual lines printed on sheet 12 may be viewed individually. FIG. 2 shows two possible guide positions. This arrangement permits the guide to be adjusted for the most convenient viewing angle by an operator, and also permits the operator to momentarily preview the next line of material or review the last line. If desired, several lines may be viewed simultaneously, e.g., in order to make corrections on the printout, by removing section 36 of support 25. Section 36 may be held to support by snap catches or the like (not shown). Auxiliary instructions entered, for example, on a card 27 or the like may be supported on guide 25, for example, by way of channel members 38 if desired, in order to provide the operator with nonchanging instructions or indices for the columns of printed material which appear in window 24. A second drive roller 28, provided with sprocket pins 29 at each end, guides paper emerging from idler 20 in an arcuate path toward the upper bin 16. A taut path between drive rollers 19 and 28 by way of idler 20 is thus assured.

Synchronous operation of rollers 19 and 28 is necessary to prevent the printout from either tearing or bunching as the sheet is advanced. In accordance with the invention, positive engagement is assured by the provision of geared teeth on the periphery of wheel 30 which locks rollers 19 and 28 together. Corresponding gear wheels 31 and 32, associated with knobs 23 and 31, respectively, on the ends of rollers 19 and 28, mesh with the gears of wheel 30. Thus either knob 23 or 31 may be used to advance printout sheets either in the forward or reverse direction, one detent spacing at a time. The detent spacing is adjusted to advance one line of printed material past window 24 at a time. If desired, an additional gear train may be provided for driving wheel 30 from an external location, e.g., by way of a foot pedal or other lever arm. Alternatively, a drive motor may be coupled to wheel 30 in order that remote advance may be provided.

As a printout sheet emerges from drive roller 28 to-

wards receptacle 16, it must be guided so that it refolds itself. Because of its tendency to follow a general arcuate path instead of dropping toward the guide 17, an auxiliary idler 33 is provided in close proximity to roller 28.

Since it has been found that several spaced rollers, e.g., of rubber, on idler 33 are not effective to prevent bunching, the idler is, in accordance with the invention, provided with an engaging surface throughout its length. Idler 33 may be covered with a soft pliable material, but preferably it is machined with a slightly roughened surface. Roller 33 is urged toward roller 28 by means of spring 34 or the like. To facilitate loading roller 33 may be retracted and dropped into slot 35. In its forward position, a printout sheet is urged against roller 28 and guided towards guide 17. Bunching is thereby avoided and proper refolding is assured. Moreover, if it is desired to reverse the operation in order to withdraw considerable length of sheet 12 from the upper bin and redeposit it in the lower bin, guide roller 33 assures effective unfolding. Deck 14 also aids in refolding the paper as it is urged into lower bin 15.

The compact arrangement of the printout reader makes it eminently suitable for on-the-job use. The entire mechanism may be supported on a pole, attached to the edge of a relay rack, or transported on a portable dolly. Such an application is illustrated in FIG. 3. An operator merely draws the dolly 37 to his work location and adjusts the viewing window to the proper angular position for ease in reading. In a typical example in practice, the reader is contained in a unit 16 inches wide, 15 inches deep, and about 7½ inches high. With a unit of this size approximately 350 feet of printer readout material, i.e., about 400 single sheets, each 15 inches by 11 inches may be contained in the unit for viewing. Approximately 25,000 lines of information are thus available for selective viewing.

The above-described arrangement is of course merely illustrative of the application of the principles of the invention. Numerous other arrangements may be devised by those skilled in the art without departing from the spirit and scope of the invention. For example, window 24 may be illuminated from behind by small incandescent or fluorescent bulbs to enhance further the readability of the printout material. A top cover may of course be employed and the overall configuration of the case may be adapted to any desired use. Further, the apparatus may be permanently mounted for use in a desk, rack, or other stationary unit.

What is claimed is:

1. Apparatus for selectively exhibiting data on computer printout sheets which comprises, in combination, means for progressively withdrawing a connected printout sheet from a first inventory of folded sheets, first guide means in the form of an elongated blade-like member equipped with a roughened surface positioned in close proximity to said withdrawing means for urging said sheet into a generally arcuate path away from said first inventory, means for progressively directing said sheet traversing said arcuate path towards a second inventory of folded sheets, second guide means for urging said sheet against said directing means, an acutely angled guide member between said arcuate path and the rest position of said second inventory of sheets for fanfolding said sheet as it enters said second inventory, means including an opaque mask with a transparent slot extending substantially the width of said member pivotally supported for movement about said arcuate path, support means fixed to said opaque mask adjacent to said transparent slot for supporting auxiliary data sheets, and means for synchronously actuating said withdrawing means and said directing means.

2. Apparatus for selectively exhibiting data on computer printout sheets which comprises, in combination, means for progressively withdrawing a connected printout sheet from a first inventory of folded sheets, first guide means in the form of an elongated blade-like member equipped with

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a roughened surface, pivotal means for supporting said first guide member in such a manner that said first guide member may be positioned in close proximity to said withdrawing means for urging said sheet into a generally arcuate path away from said first inventory as said sheet emerges from said inventory and for enabling said first guide member to be withdrawn from said inventory to facilitate loading and removal of printout sheets from said inventory, means for progressively directing said sheet traversing said arcuate path towards a second inventory of folded sheets, second guide means for urging said sheet against said directing means, an acutely angled guide member between said arcuate path and the rest position of said second inventory of sheets for fanfolding said sheet as it enters said second inventory, means including an opaque mask with a transparent slot extending substantially the width of said member pivotally supported for movement about said arcuate path, and means for synchronously actuating said withdrawing means and said directing means.

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20 ROBERT B. REEVES, *Primary Examiner.*