Dec. 31, 1968 TOSHIRO SAWAKI 3,419,124

CABLE POSITIONED TYPE DRUM PRINTER

Filed June 7, 1967 Sheet 1 of 2

Fig. 1

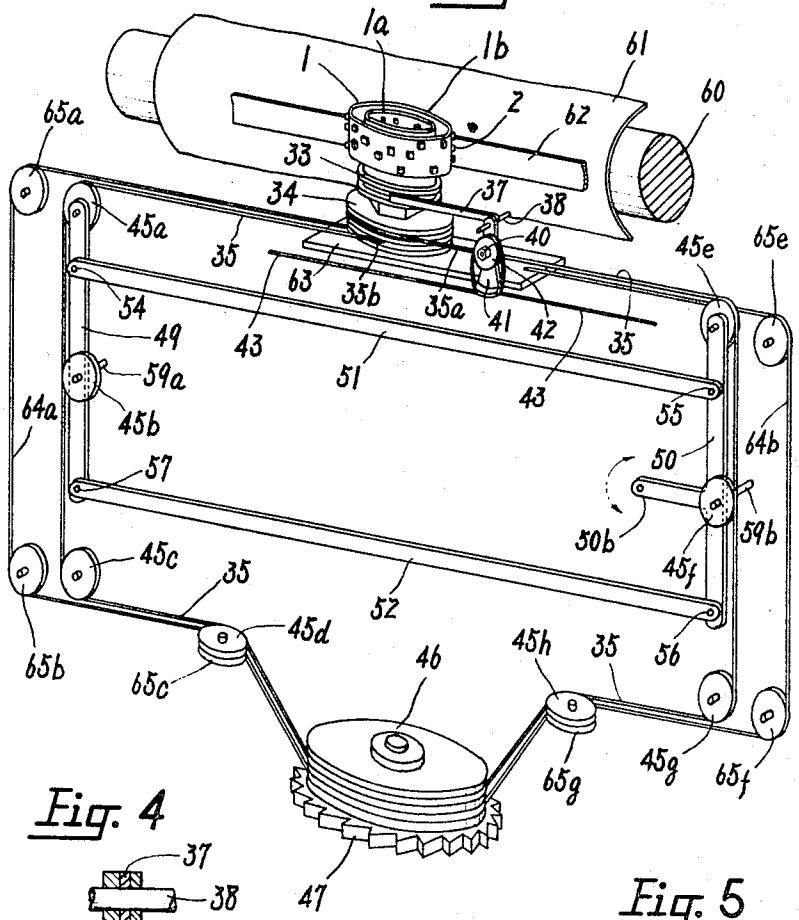

Fig. 4

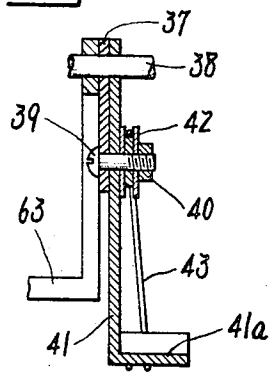

Fig. 5

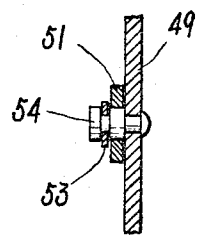

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Fig. 2

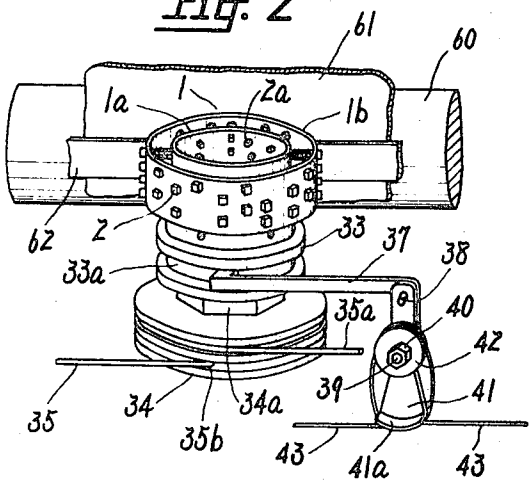
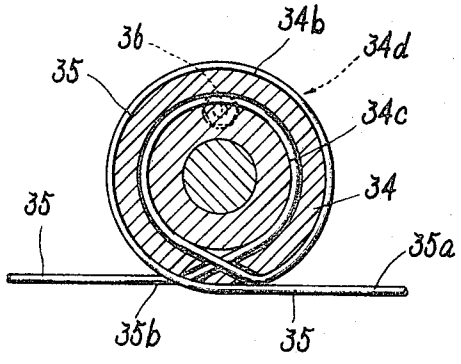


Fig. 3



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CABLE POSITIONED TYPE DRUM PRINTER

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5 Claims. (Cl. 197—53)

ABSTRACT OF THE DISCLOSURE

The present invention discloses a printer wherein the vertical direction or rotating direction of a type carrier is selected by a selecting wire which is positively driven by a positive driving mechanism.

This invention relates to a printer.

An object of the present invention is to provide a printer wherein, in case types supported by type carrier such as a type drum or type box are to be selected with a selecting wire, said wire is positively driven.

Another object of the present invention is to provide a printer wherein the type selecting operation can be carried out positively at a high speed without pulling the conventional selecting wire at one end with the tension of a spring.

In the accompanying drawings:

FIG. 1 is a schematic perspective view of a printer embodying the present invention;

FIG. 2 is a detailed perspective view of a type drum, type wheel support, horizontal pulley and vertical lever in FIG. 1;

FIG. 3 is a plan view of a horizontal selecting wire clamped to the horizontal pulley;

FIG. 4 is a sectional view showing a vertical lever, vertical drum pulley, vertical clamp and vertical selecting wire as engaged; and

FIG. 5 is a sectional view showing a horizontal lever and a link as engaged.

In FIG. 1 which is a schematic perspective view of a printer of the present invention, **1** is a type drum having a thin cylindrical inside drum case **1***a* and outside drum case **1***b*. Types **2** are set between the above mentioned cases. The heads of the types are arranged along the peripheral surface of the type drum and the supporting bars **2***a* of the types **2** (see FIG. 2) are projected toward the center axis of the drum **1** so that, when these supporting bars **2***a* are struck with a type hammer (not illustrated), the types **2** may slide outward for typing.

33 is a type wheel support. As illustrated in detail in FIG. 2, the type drum **1** is removably fixed to one end of support **33** by such means as screws.

Further, a sliding groove **33***a* is formed on the outer periphery of said type wheel support **33**. **34** is a horizontal pulley. The above mentioned type wheel support **33** is fitted to the hexagonal column part **34***a* of said pulley. A horizontal selecting wire **35**, to control the rotation of the type drum **1**, is clamped to said pulley **34** as illustrated in FIGS. 2 and 3. For the sake of brevity, only a part of the horizontal selecting wire **35** is shown in FIGS. 2 and 3. As illustrated in FIG. 3, the horizontal selecting wire **35** is so wound that one end **35***a* may enter an upper groove **34***b* made on the outer periphery of the horizontal pulley **34**, may surround the grove substantially by one turn round, may then enter an inner groove **34***c* inside the pulley **34**, may surround said groove by one round, may be inserted into a lower groove **34***d* on the outer periphery of the above mentioned pulley **34** and may come out at the end **35***b*. That is to say, the horizontal selecting wire **35** is wound in the spiral form of

Q. **36** is a screw (see FIG. 3) for fixing the horizontal selecting wire **35** in the inner groove **34***c* of the horizontal pulley **34**.

The type wheel support **33** is slidable in the vertical direction with respect to the horizontal pulley **34** but is fixed to pulley **34** in the rotating direction.

A lever **37**, for vertical or axial displacement of drum **1**, is pivotally mounted on a shaft or pin **38**, as shown in FIG. 4. One end of lever **37** is engaged in a groove **33***a* of type wheel support **33**, as best seen in FIG. 2. The opposite end of lever **37** is secured to a vertical driving pulley or sector **41**, pivoted on pin or shaft **38**, by means of a bolt **39** and a nut **40**. A selecting wire **43** is provided for swinging or oscillating pulley **41** and lever **37**, and only part of this wire **43** has been shown in FIGS. 1 and 2, for the sake of simplicity. Wire **43** extends in opposed directions along the arcuate surface **41***a* of pulley or sector **41**, the wire **43** being, in effect, wound on this surface and around a spacer on bolt **39**. The portion of wire **43** wound around the spacer is clamped in position by clamping means **42** tightened by bolt **39** and nut **40**. That is to say, the vertical selecting wire **43** is wound in the form of *l*. Further, the above mentioned shaft **38** is supported with the later described feeding carrier **63**.

In the following, in the embodiment illustrated in FIG. 1, and for the sake of brevity of the explanation, there is illustrated a positive driving mechanism for positively driving the horizontal selecting wire **35** in the case of selecting the type in the rotating direction of the type drum **1**. However, the positive driving mechanism for positively driving the vertical selecting wire **43** in the case of selecting the type in the vertical direction of the type drum **1** may be made by duplicating the above mentioned positive driving mechanism and therefore will be neither illustrated nor explained here.

The above mentioned horizontal selecting wire **35** is wound and fixed at one end to a feeding drum **46** through pulleys **45***a*, **45***b*, **45***c* and **45***d*, and at the other end to the feeding drum **46** through pulleys **45***e*, **45***f*, **45***g* and **45***h* so as to form a closed loop.

Further, said pulleys **45***a* and **45***c* are rotatably mounted on the ends of the later described left horizontal selecting lever **49** and right horizontal selecting lever **50**, respectively, the pulleys **45***c*, **45***d*, **45***g* and **45***h* are rotatably mounted on a base plate not illustrated and the pulleys **45***b* and **45***f* are rotatably mounted on the later described shafts **59***a* and **59***b*, respectively.

The above mentioned feeding drum **46** has a feeding ratchet **47** integrally secured to it.

The positive driving mechanism will now be explained. **49** is a left horizontal selecting lever rotatably mounted on shaft **59***a*. **50** is a right horizontal selecting lever rotatably mounted on shaft **59***b*. These two levers **49** and **50** are connected with each other through an upper link **51** and lower link **52** made of a steel sheet or wire, at joints **54**, **55**, **56** and **57**. At these joints, as exemplified in FIG. 5, the upper link **51** (or the lower link **52**) is fitted at one end to a post or the like integrally fixed to the left horizontal selecting lever **49** (or the right horizontal selecting lever **50**) and is fixed with a snap **53**. If, by a selecting mechanism not illustrated, the displacement corresponding to each type **2** in the type drum **1** is given to one end **50***b* of the right horizontal selecting lever **50** or, for example, the end **50***b* is displaced in the direction indicated by the solid line arrow by any amount of displacement, the right horizontal selecting lever **50** will rotate clockwise by a certain angle around the shaft **59***b* as a center. In such case, the joint **55** will also rotate rightward and will pull the joint **54** rightward through the upper link **51**.

Therefore, the left horizontal selecting lever **49** will rotate clockwise around the shaft **59***a* as a center. That is to say, by the positive drive of the above mentioned levers **49** and **50**, the horizontal selecting wire **35**, wound into the grooves of the pulley **34**, positively controls rotation of the type drum **1**.

Further, if one end **50***b* of the right horizontal selecting lever **50** is displaced in the direction indicated by the dotted line arrow by any amount of displacement, the right horizontal selecting lever **50** will rotate anticlockwise by a certain angle around the shaft **59***b* as a center. In such case, the joint **56** will also rotate rightward and will pull the joint **57** rightward through the lower link **52**.

Therefore, the left horizontal selecting lever **49** will rotate anticlockwise around the shaft **59***a* as a center. That is to say, by the positive drive of the above mentioned levers **49** and **50**, the horizontal selecting wire **35**, wound into the groove of the horizontal pulley **34**, positively controls the rotation of the type drum **1**.

60 is a platen, **61** is a typing paper and **62** is an ink ribbon.

The spacing operation of the type drum **1** will now be explained.

63 is a feeding carrier which rotatably supports the above mentioned horizontal pulley **34** and also the vertical lever **37** and vertical driving pulley **43**. **64***a* and **64***b* are spacing wires which are fixed each at one end to the above mentioned carrier **63** and are wound and fixed each at the other end on the feeding drum **46** through pulleys **65***a*, **65***b* and **65***c* and pulleys **65***e*, **65***f* and **65***g*, respectively.

Therefore, if the feeding ratchet **47** is rotated by a step-by-step mechanism not illustrated, the spacing wires **64***a* and **64***b* will be wound into the feeding drum **46** in turn so that the feeding carrier **63** (type drum **1**) may carry out the spacing operation.

As explained above, according to the present invention, as the left horizontal selecting lever **49** and the right horizontal selecting lever **50** are connected with each other through the upper link **51** and lower link **52** made of a steel sheet or wire, in the right and left swinging operations for the selection of the right horizontal selecting lever **50** or, for example, in the clockwise swinging operation of the lever **50**, the left horizontal selecting lever **49** will be operated by the tension of the above mentioned upper link **51** and, in the anticlockwise swinging operation, the left horizontal selecting lever **49** will be operated by the tension of the above mentioned lower link **52**. Therefore, even if said upper link **51** or lower link **52** is made of a very thin steel sheet or wire, it will not bend. Further, it can be made light. Therefore, a positive driving mechanism which can make a high speed selecting operation can be provided according to the present invention.

Further, when such positive driving mechanism as is mentioned above is used, the selecting operation will be able to be carried out more positively at a higher speed than by pulling a selecting wire such as is conventionally used at one end with the tension of a spring.

What is claimed is:

1. A printer comprising a rotatably and axially movable type drum having types mounted on its peripheral surface; a first selecting wire operable to rotate said type drum and selecting means, including a second selecting wire, operable to move said type drum axially, to select a given type; a movable carrier, including an externally grooved first pulley having an axial shaft, mounting said

type drum, said type drum being mounted on said shaft for axial displacement relative to said pulley by a grooved connection preventing rotation of said type drum relative to said pulley; said pulley having a radially inner substantially circular groove; said first selecting wire being wound around said pulley and having at least one turn within said inner groove; means operable to rotate said type drum and including a pair of relatively elongated selecting levers pivotal about fulcrums intermediate their ends, a first link pivotally connected at opposite ends to said levers on one side of the fulcrums thereof and a second link pivotally connected to said levers on the opposite side of the fulcrums thereof; a feeding drum; said first selecting wire extending from said first pulley around second pulleys on each of said selecting levers and to said feeding drum; and two spacing wires each having one end secured to said movable carrier and an opposite end wound around and secured to said feeding drum; selection of types in the rotary direction of movement of said type drum being effected by concurrently pivoting said selecting levers about their fulcrums.

2. A printer, as claimed in claim **1**, wherein spacing of said type drum along a line to be typed is effected by rotating said feeding drum to wind one spacing wire thereabout while correspondingly unwinding the other spacing wire therefrom.

3. A printer, as claimed in claim **1**, wherein said first pulley is formed with a pair of axially spaced peripheral grooves each communicating with said radially inner groove; said first selecting wire extending around one of said peripheral grooves, then through the connection thereof with said inner groove, then around said inner groove, then through the connection of said inner groove with the other peripheral groove, and around said other peripheral groove.

4. A printer, as claimed in claim **1**, wherein said selecting means includes a pivoted lever having a free end engaged in a circumferentially extending groove of said type drum; said second selecting wire being operatively connected with said last-named lever to pivot the same in a direction to effect axial displacement of said type drum relative to said pulley.

5. A printer, as claimed in claim **4**, wherein said selecting means includes a third pulley oscillatable about the pivot of said last-named lever; means securing said last-named lever and said third pulley to each other for conjoint oscillation; said second selecting wire being wound around said third pulley; and clamping means securing said second selecting wire in fixed relation to said third pulley adjacent the pivotal mounting thereof.

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U.S. Cl. X.R.

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