

[54] **FORMS FEEDING DEVICE**

3,693,856 9/1972 Funk..... 226/74

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[57] **ABSTRACT**

[52] **U.S. Cl.**..... **226/76, 226/179**

[51] **Int. Cl.** **G03b 1/24**

[58] **Field of Search**..... 226/74, 75, 179,
226/79, 76

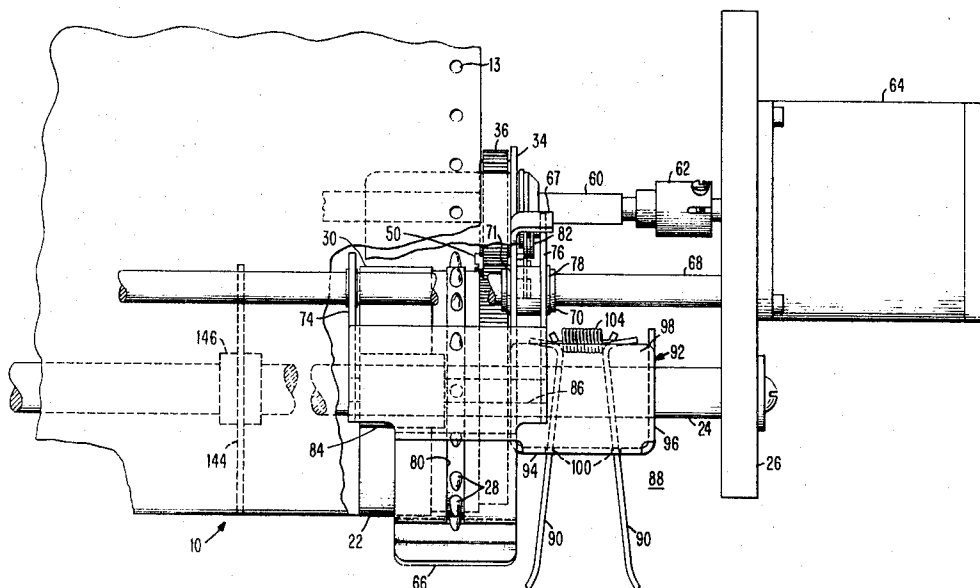
An inexpensive and efficient forms feeding device for a printer utilizes a pair of independent sprocket feed wheels which are quickly adjustable to almost any width form and which are driven from a common drive shaft.

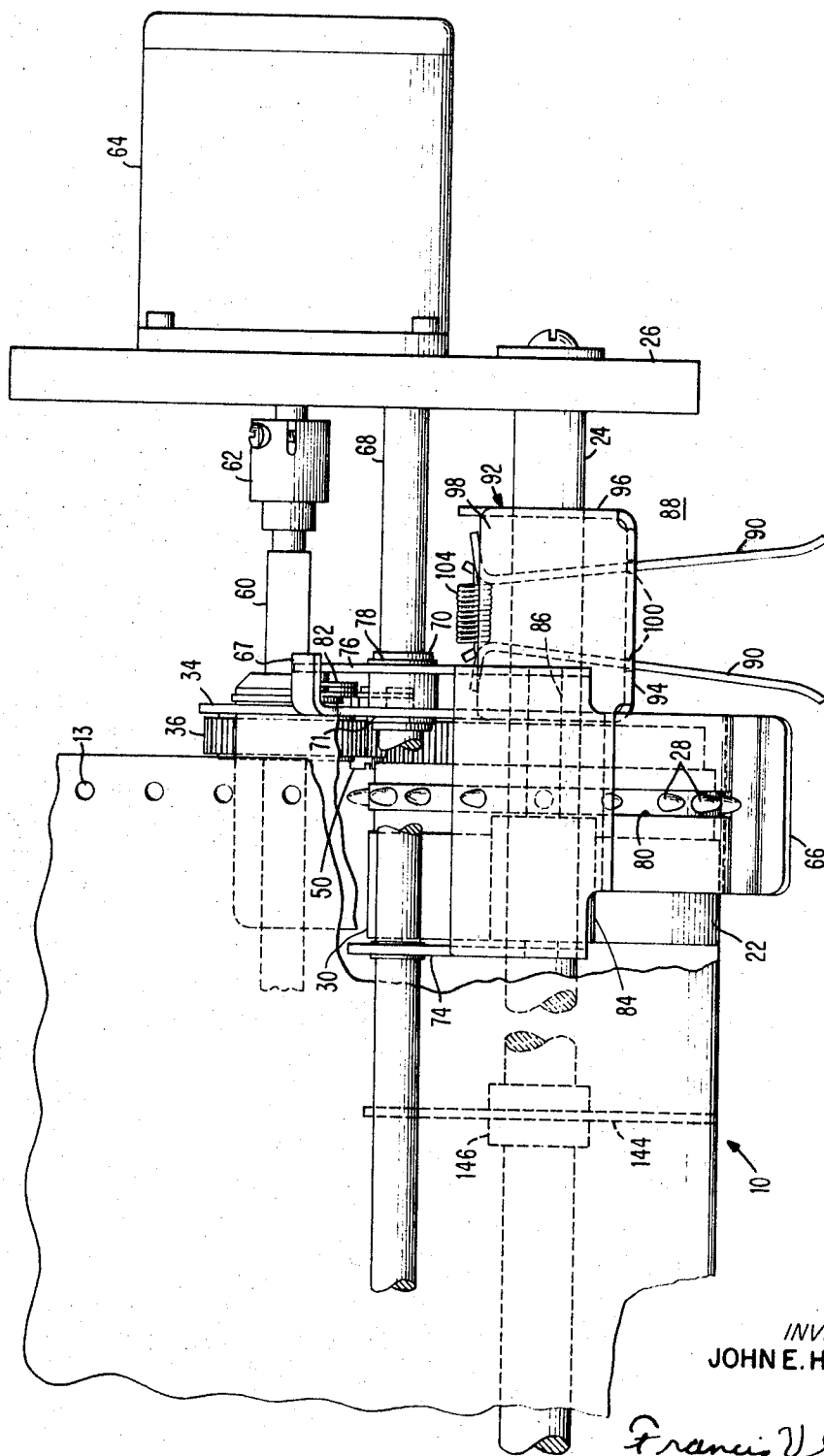
[56] **References Cited**

UNITED STATES PATENTS

3,687,347 8/1972 Rod 226/74

7 Claims, 5 Drawing Figures





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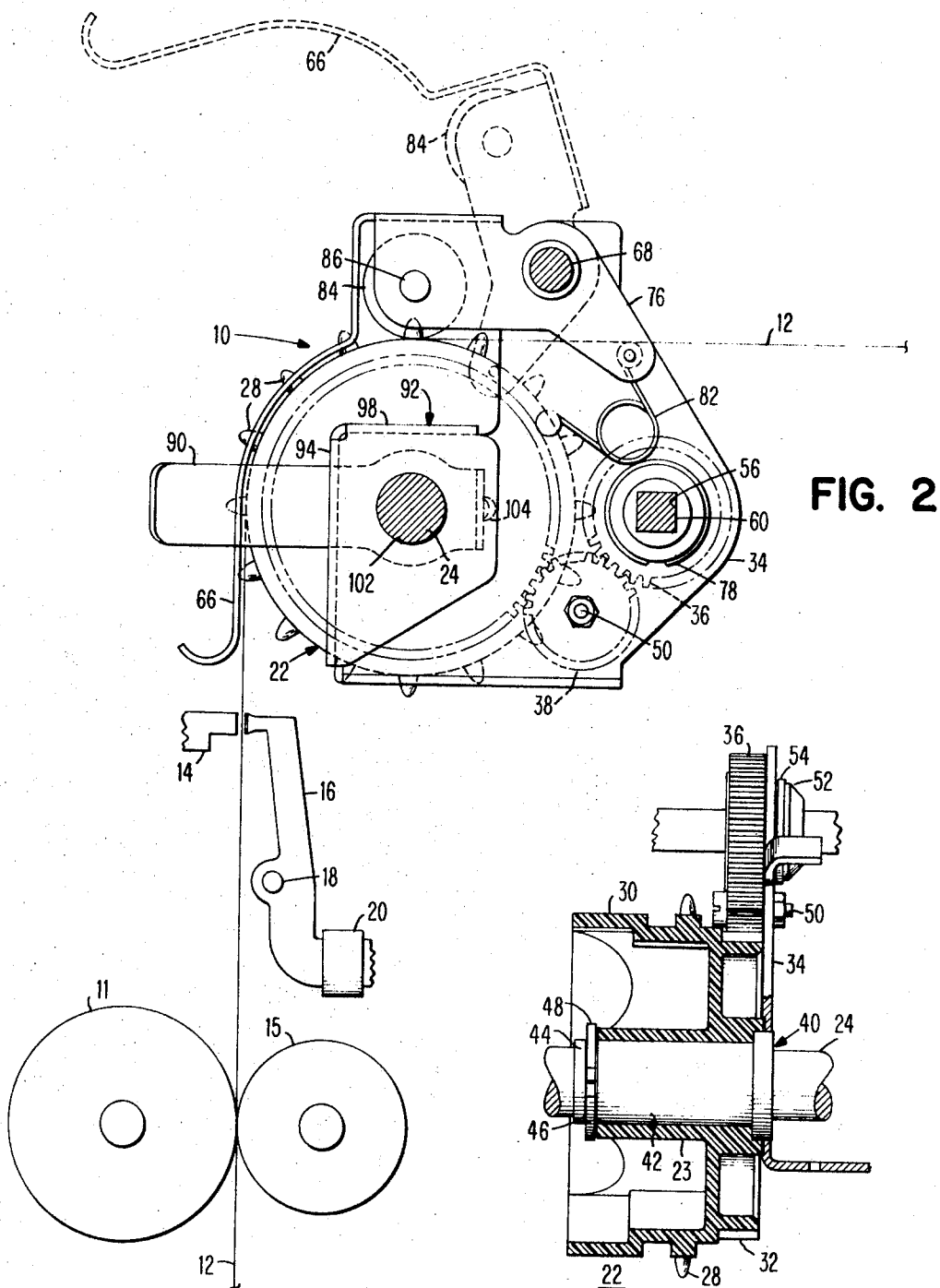


FIG. 2

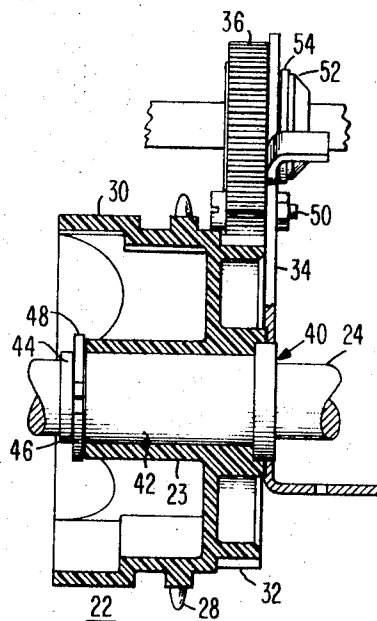


FIG. 3

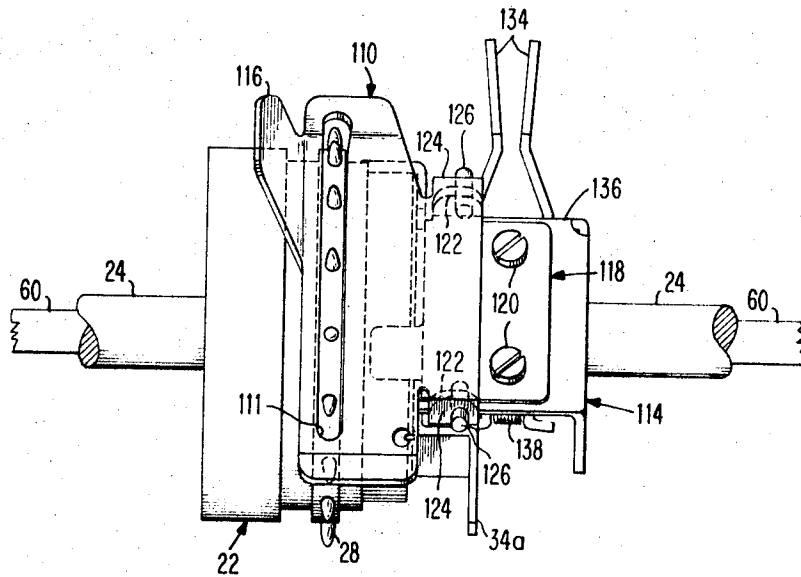


FIG. 4

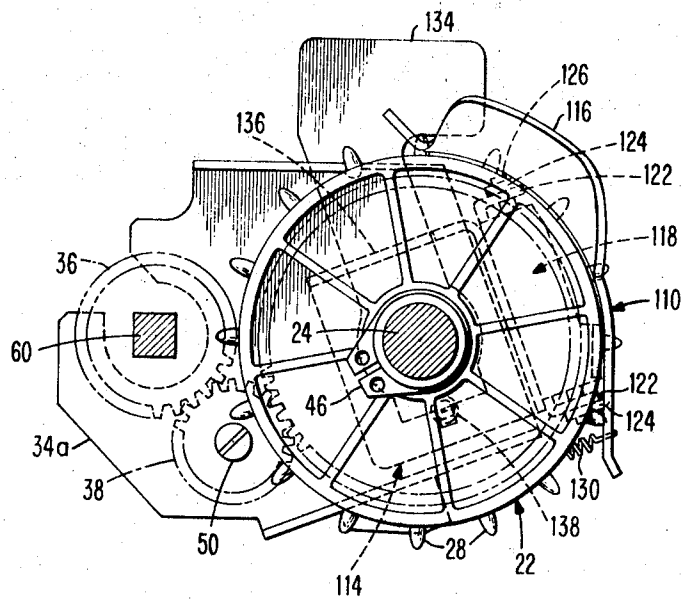


FIG. 5

FORMS FEEDING DEVICE

FIELD OF THE INVENTION

This invention relates generally to forms feeding devices and it has reference in particular to a continuous forms feeding carriage for a printer.

DESCRIPTION OF THE PRIOR ART

Forms feeding carriages are known in which tractors having endless belts with pins are used to feed continuous forms such as shown in U.S. Pat. No. 2,302,704, which issued Nov. 24, 1942, to Carl R. Mabon.

SUMMARY OF THE INVENTION

Generally stated, it is an object of this invention to provide a simple and inexpensive improved forms feeding device for a printer.

More specifically, it is an object of this invention to provide a readily adjustable forms feeding device which can accommodate a wide range of forms widths.

It is also an object of this invention to provide a forms feeding device having a pair of separate sprocket wheels, each with a quick release clamp for securing the sprocket wheels at any one of a large number of positions so as to accommodate a wide range of forms widths.

Another object of this invention is to provide for using adjustable sprocket wheels for handling forms of different widths, with the sprocket wheels having relatively wide forms supporting surfaces adjacent the sprocket pins.

Yet another object of this invention is to provide for mounting each of a pair of sprocket wheels on a separate carrier plate together with the drive gears therefor, and mounting the carrier plates on a pair of parallel shafts, one of which provides the drive to the drive gears.

It is also an important object of this invention to provide for mounting a sprocket wheel and a train of drive gears therefor on a carrier plate which moves on a pair of spaced apart shafts, and for mounting a quick release clamp means on the carrier plate for clamping the carrier plate and sprocket wheel to one of said shafts.

Still another important object of this invention is to provide for mounting a forms feeding sprocket wheel and its train of drive gears on a carrier plate, and for mounting a pressure roll on said carrier plate for cooperating with a surface portion of the sprocket wheel for friction feeding of forms.

It is also another object of this invention to provide for mounting a pressure roll on a pivoted cover for a forms feeding sprocket wheel so that the pressure roll is releasably positioned in operating relation with a surface portion of the sprocket wheel.

In a preferred embodiment of the invention a pair of carrier plates are mounted in spaced apart slidable relation on a support shaft and each carries a sprocket wheel having gear teeth formed about the periphery adjacent one edge. Sprocket pins are provided intermediate the edges of the wheels to cooperate with spaced holes in forms which are to be fed. A drive gear is rotatably mounted on each carrier plate having an idler gear connecting it with the teeth on the sprocket wheel. A square drive shaft passes through both drive gears with a sliding fit to provide a drive for the sprocket wheels. Quick release clamps are provided on each carrier plate to releasably clamp the carrier plates and associ-

ated sprocket wheels at any of a plurality of positions along the support shaft to accommodate different width forms.

The foregoing and other objects, features and advantages of the invention will be apparent from the following more detailed description of preferred embodiments of the invention, as illustrated in the accompanying drawing.

DESCRIPTION OF THE DRAWING

In the Drawing

FIG. 1 is a partial plan view, partly broken away, of a printer mechanism embodying the invention in one of its forms;

FIG. 2 is a schematic partial vertical cross section view of the carriage mechanism shown in FIG. 1, showing its relation to a print mechanism;

FIG. 3 is a partial plan view, partly sectioned, of the mechanism of FIG. 2 showing the carrier plate, sprocket wheel and drive gear relationship;

FIG. 4 is a partial plan view of a modified form of the carriage mechanism of FIG. 2; and

FIG. 5 is a partial view in vertical cross section of the mechanism of FIG. 4.

DESCRIPTION OF PREFERRED EMBODIMENTS

Referring particularly to FIG. 2 of the drawing, the reference numeral 10 denotes generally one of two forms feeding devices used in conjunction with Feed Rolls 11 and 15 for feeding Continuous Forms or Document 12 past a print line defined by a Type Character 14 representing a chin or train of characters, which move along a print line perpendicular to the surface of the drawing past a plurality of print hammers represented by the Hammer 16, which comprises an armature pivotally supported at 18 to be actuated by means of a solenoid 20 for impacting the Document 12 against the Type Characters 14 for printing on the document.

Referring to FIGS. 1 and 2, the Forms Feeding Device 10 may comprise a pair of sprocket wheels positioned in spaced apart relation for feeding the Continuous Forms 12 and represented by the right-hand Sprocket Wheel 22, it being understood that there is a corresponding left-hand sprocket wheel associated therewith. The Sprocket Wheel 22 is mounted on a Support Shaft 24, which spans between two end plates similar to the End Plate 26. As shown in FIG. 3, the Sprocket Wheel 22 is provided with a plurality of Sprocket Pins 28 about its periphery for engaging Holes 13 in Continuous Forms 12. The sprocket wheel has a relatively wide, flat Support Surface 30 adjacent the sprocket pins for supporting the Document or Forms 12. A plurality of Gear Teeth 32 are formed integrally with the right-hand edge of the Sprocket Wheel 22 for driving the sprocket wheel. The Sprocket Wheel 22 may, for example, be molded from a plastic such as a glass-filled polycarbonate, with the Gear Teeth 32 being formed in the molding process. As shown, the Sprocket Wheel 22 is mounted on the Shaft 24 by being secured to a relatively flat Carrier Plate 34 together with a Drive Gear 36 and an Idler Gear 38. The Sprocket Wheel 22 is fastened to the Carrier Plate 34 by means of a Bushing 40 which is secured in an opening in the Carrier Plate 34, being for example, staked to maintain the bushing in fixed relation with the carrier plate. The bushing has a Cylindrical Portion 42, which receives a Hub Portion 23 of the Sprocket Wheel

22, and an Extension 44 having a Groove 46, which receives a Spring Clip 48 for locking the sprocket wheel rotatably on the Bushing 40. The Idler Gear 38 is secured to the Carrier Plate 34 by means of a Screw 50, while the Drive Gear 36 is mounted on the Carrier Plate 34 by means of a Hub Portion 52, which is positioned in and projects through an opening in the Carrier Plate 34, and provided with a Spring Clip 54 for locking the Drive Gear 36 in rotatable relation with the Carrier Plate 34. The Drive Gear 36 is provided with a rectangular Opening 56 for receiving a rectangular Drive Shaft 60, which is connected by means of a Clutch 62 to a Motor 64 mounted on the End Plate 26.

The Sprocket Wheel 22 is provided with a Hinged Cover 66, which may be pivotally mounted on a Support Shaft 68 and connected in pivotal relation with the Carrier Plate 34 by means of a Bushing 70, which passes through an opening in the carrier plate and is secured relative thereto by a Spring Clip 72. The Hinged Cover 66 is provided with depending Flange Portions 74 and 76 having openings to receive the Support Shaft 68. The Bushing 70 is slidably disposed on Shaft 68 and also passes through an opening in the depending Flange 76 and has a Spring Clip 78 securing the Flange 76 to the spacer thereby maintaining the Cover 66 in fixed relation with the Carrier Plate 34. The Cover 66 is provided with an open Slot 80 through which the Sprocket Pins 28 may project. A Hairpin Spring 82 connected to the depending Flange 76 and to the Carrier Plate 34 by a Pin 82 resiliently biases the hinged cover toward the Sprocket Wheel 22 and provides a toggle action for holding the cover in the raised position against Stop Tab 67 as shown in dotted outlines. A Pressure Roll 84 is mounted on the Cover 66 by means of a Shaft 86 for cooperating with the relatively flat Portion 30 of the Sprocket Wheel 22 for friction feeding forms not provided with sprocket holes.

In order to readily position the Sprocket Wheel 22 in any of a number of different positions along the Support Shaft 24, Quick Release Means 88 is provided. This may comprise a pair of Quick Release Levers 90, which are pivotally supported in a substantially rectangular Housing 92 on the Carrier Plate 34, formed by bending extending tabs from the Carrier Plate 34 to provide a substantially vertical Front Portion 94, End Portion 96 and a Top or Cover Portion 98. Slots 100 are provided in the Front Portion 94 through which the quick release levers may project. The portions of the Quick Release Levers 90 within the Housing 92 are provided with Holes 102, which slidably receive the Support Shaft 24. A Spring 104 connects the inner ends of the Levers 90 to bias them towards each other in an inclined relation so that the edges of the Holes 102 bind on the Shaft 24 and maintain the Housing 92, Carrier Plate 34 and Sprocket Wheel 22 in fixed relation with the Support Shaft 24. The Sprocket Wheel 22 may be readily moved along the Support Shaft 24 by gripping the outer ends of the Quick Release Levers 90 and pinching them together to spread the inner ends, so that the Levers 90 approach a substantially parallel position, which releases the clamping action thereof with the Support Shafts 24, permitting the sprocket wheel to be moved to any suitable position.

Referring to FIGS. 4 and 5, a modified form of the invention is shown wherein the Sprocket Wheels 22 are similarly mounted on a Carrier Plate 34a together with

the Drive Gear 36 and Idler Gear 38. A square Shaft 60 is likewise used to drive the Drive Gear 36.

Instead of utilizing two support shafts in addition to the rectangular Drive Shaft 60, only a single Support Shaft 24 is utilized and the Hinged Cover 110 for the Sprocket Wheel 22 is mounted on the top of the rectangular Housing 114, which is formed by bending projecting tabs from the Carrier Plate 34a. As shown, the Cover 110 has a Slot 111 for the sprocket pins and has an upwardly-projecting Operating Tab 116 and is connected by means of a Bracket 118 secured to the Housing 114 by means of Screws 120 and having spaced apart upwardly-projecting Tabs 122 adjacent one edge. The Hinged Cover 110 is provided with corresponding depending Tabs 124 and a Pivot Pin 126 extends through openings in the tabs to provide a hinge connection. A Spring 130 connecting the Cover 110 and the Carrier Plate 34a provides the desired biasing action for the cover. Quick Release Levers 134 are pivotally mounted in slots in the vertical Wall 136 of the Housing 114 and are connected together by means of a Spring 138 to releasably clamp the Carrier Plate 34a and the Sprocket Wheel 22 in any of a number of positions on the Support Shaft 24, in the same manner as described and shown in connection with the forms feeding device of FIGS. 1 and 2.

While only a single forms feeding device has been shown, in each instance, namely, the right-hand forms feeding device, it will be realized that a pair of Forms Feeding Devices 10 are used in spaced apart relation, one adjacent each edge of the Forms 12 to be fed. The left-hand forms feeding device is substantially identical in construction and operation with that of the right-hand forms feeding device shown, but it will be realized that the left-hand forms feeding device will be substantially a mirror image of the right-hand forms feeding device, having the flat portion of the sprocket wheel on the right-hand side and the quick release mechanism positioned on the left-hand side, instead of as shown for the right-hand forms feeding device. Otherwise, the two forms feeding devices are identical in construction and operation. A plurality of Disks 144 positioned on the Support Shaft 24 by means of Hub Portions 146, may be slidably disposed on the Support Shaft 24 for supporting intermediate portions of the Forms 12 between the Sprocket Wheels 22.

While the invention has been shown and described with reference to preferred embodiments thereof, it will be understood by those skilled in the art that various changes in form and details may be made therein without departing from the spirit and scope of the invention.

What is claimed is:

1. In a forms feeding device
a support shaft,

a pair of sprocket wheels rotatably and slidably mounted on said support shaft and having means including releasable clamp means operatively connected to said sprocket wheels to clamp said sprocket wheels at different selected positions along said support shaft;

a drive shaft disposed in spaced relation with said support shaft, and

a carrier plate slidably mounted on said shafts having rotatable drive means secured thereto and connected in driving relation with said drive shaft and with one of said sprocket wheels.

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2. The invention as defined in claim 1, characterized by said sprocket wheel including gear teeth formed thereon adjacent one edge of said sprocket wheel and said drive means including at least one drive gear connected in driving relation with said gear teeth on said sprocket wheel, and having a sliding drive fit with said drive shaft.

3. The invention as defined in claim 2, characterized by said sprocket wheel having a relatively wide surface portion adjacent one edge providing support for forms being fed by said sprocket wheel.

4. The invention as defined in claim 3, characterized by a hinged cover partially enclosing and cooperative with said sprocket wheel spring biased to maintain a

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form against said sprocket wheel.

5. The invention as defined in claim 4, characterized by said cover being pivotally connected with said carrier plate.

6. The invention as defined in claim 5, characterized by a rotatable pressure roll mounted on said cover to maintain a form in driving engagement with said relatively wide surface portion of said sprocket wheel.

7. The invention as defined in claim 5, characterized by a plurality of wheel members slidably disposed on said support shaft between said sprocket wheels to support forms being fed by said sprocket wheels.

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