

July 19, 1960

J. T. DAVIDSON

2,945,435

RIBBON INKER IN BED AND CYLINDER PRINTING DEVICE

Original Filed Feb. 28, 1952

4 Sheets-Sheet 2

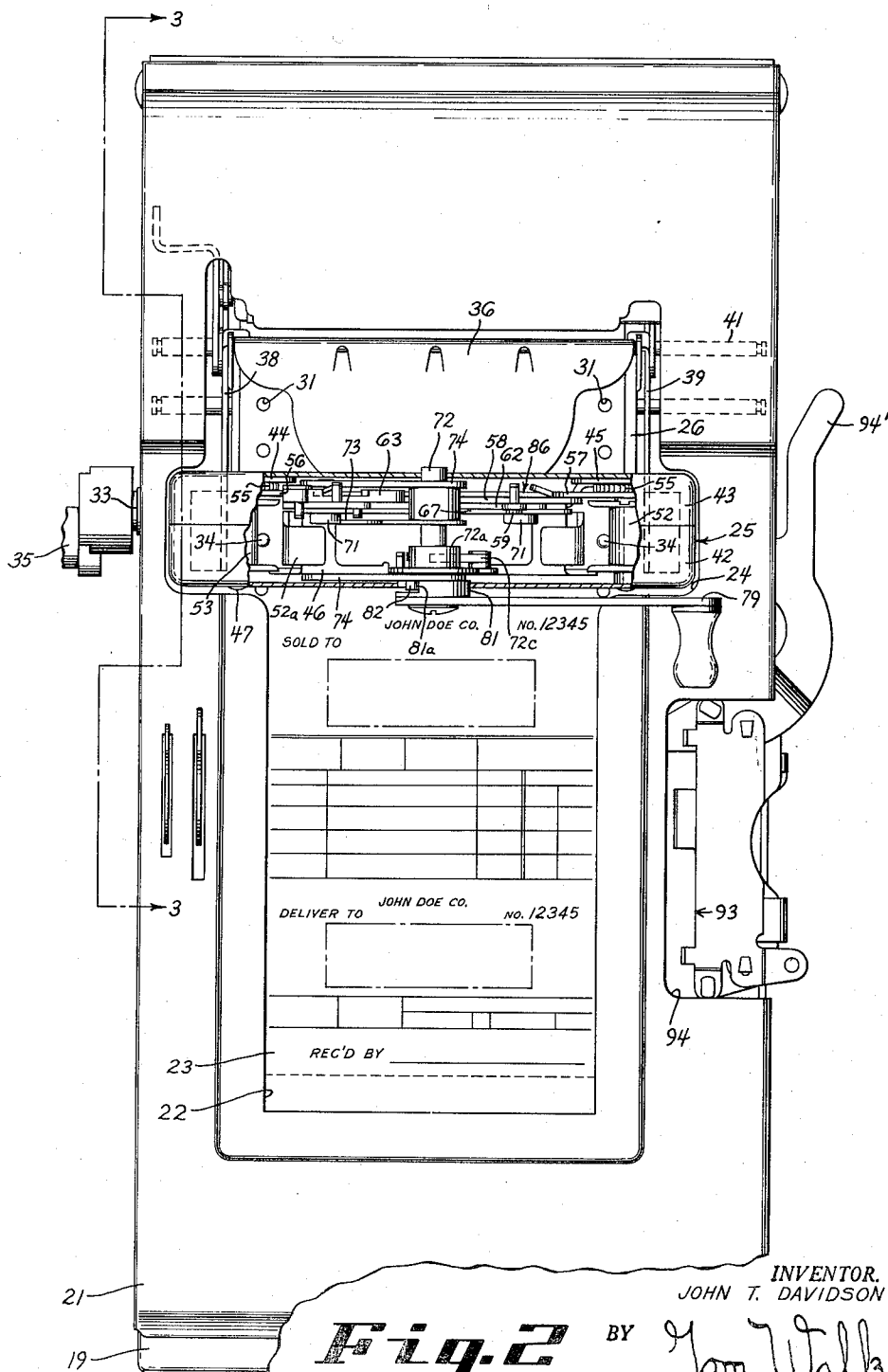


Fig. 2

BY

INVENTOR.
JOHN T. DAVIDSON

BY *Tom Walker*
ATTORNEY

July 19, 1960

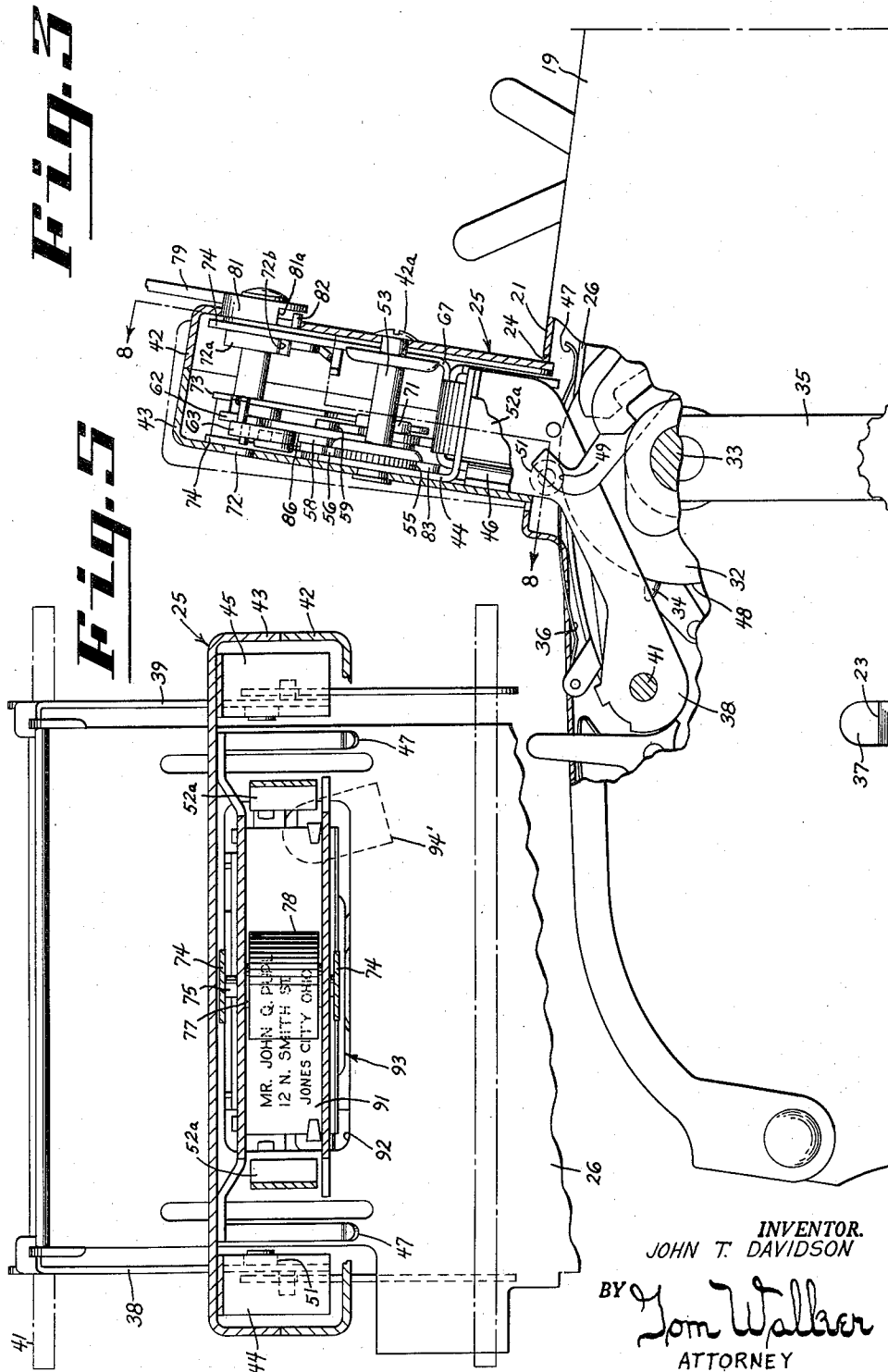
J. T. DAVIDSON

2,945,435

RIBBON INKER IN BED AND CYLINDER PRINTING DEVICE

Original Filed Feb. 28, 1952

4 Sheets-Sheet 3



July 19, 1960

J. T. DAVIDSON

2,945,435

RIBBON INKER IN BED AND CYLINDER PRINTING DEVICE

Original Filed Feb. 28, 1952

4 Sheets-Sheet 4

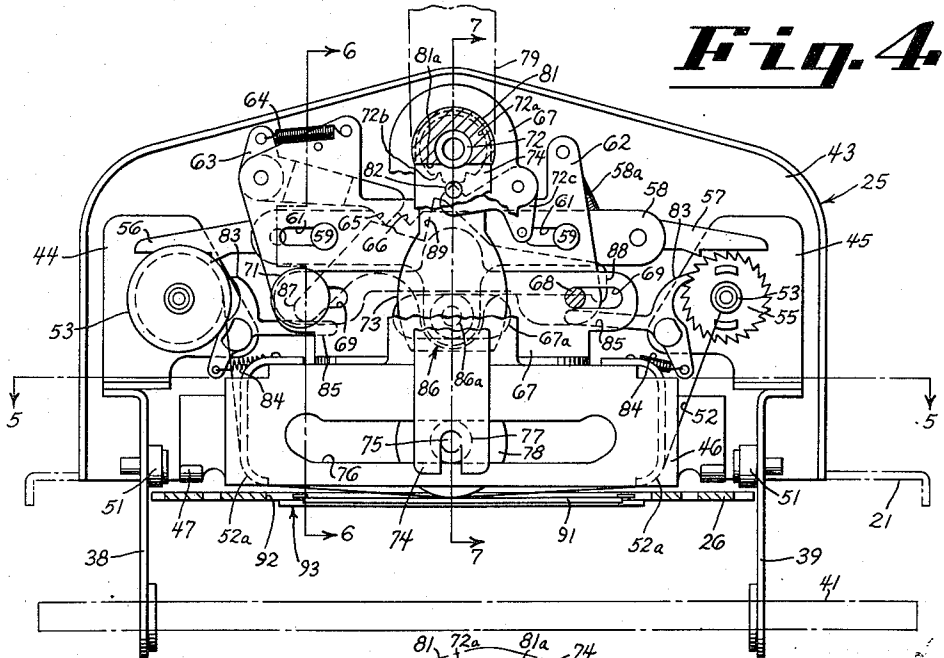


Fig. 4

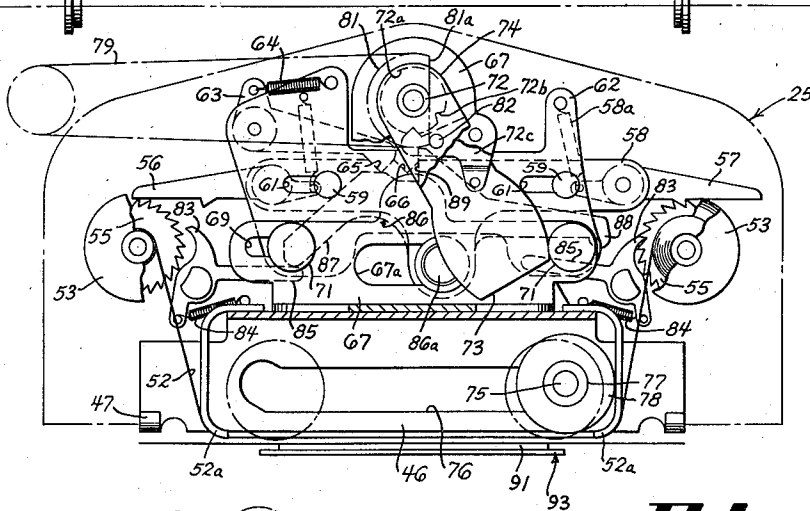


Fig. 8

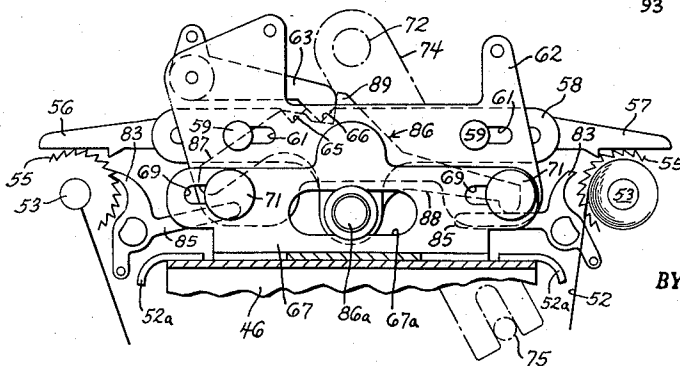


Fig. 9

INVENTOR.
JOHN T. DAVIDSON

BY

Tom Walker
ATTORNEY

1

2,945,435

RIBBON INKER IN BED AND CYLINDER
PRINTING DEVICE

John T. Davidson, Dayton, Ohio, assignor to The Standard Register Company, Dayton, Ohio, a corporation of Ohio

Original application Feb. 28, 1952, Ser. No. 274,021, now Patent No. 2,782,714, dated Feb. 26, 1957. Divided and this application Aug. 30, 1956, Ser. No. 607,124

3 Claims. (Cl. 101—274)

This invention relates to imprinting mechanism and has particular although not limited reference to autographic registers and like machines. This is a division of copending application Serial No. 274,021, filed February 28, 1952, for Autographic Register, now Patent No. 2,782,714, issued February 26, 1957.

The object of the invention is to simplify the construction as well as the means and mode of operation of imprinting mechanisms, whereby such mechanisms may not only be economically manufactured, but will be more efficient and satisfactory in use, adaptable to a wide variety of applications, and be unlikely to get out of repair.

An object of the invention is to provide a simple and easily operated imprinting unit which, in its application to an autographic register, occupies the position in the register normally taken by the tear bar and hold down clamp and which performs its own function and those of the parts replaced without occupying any more space than the replaced elements.

Another object of the invention is to provide a roll imprinting mechanism adapted for use with printing plates brought selectively to a position of registry with the imprinting mechanism.

A further object of the invention is to introduce in the imprinting mechanism a generally new ribbon feeding and reversing mechanism.

Still another object of the invention is to combine imprinting mechanism and ribbon feeding and reversing mechanism in a single unitary structure adapted for mounting on an autographic register or like machine for regular or selective use thereon.

A further object of the invention is to provide an imprinting mechanism possessing the advantageous structural features, the inherent meritorious characteristics and the mode of operation herein mentioned.

With the above primary and other incidental objects in view as will more fully appear in the specification, the invention intended to be protected by Letters Patent consists of the features of construction, the parts and combinations thereof, and the mode of operation as hereinafter described or illustrated in the accompanying drawings, or their equivalents.

Referring to the accompanying drawing wherein is one but obviously not necessarily the only form of embodiment of the invention.

Fig. 1 is a view in perspective of an autographic register, showing the invention in its illustrated form;

Fig. 2 is a fragmentary view in top plan of the register, with some of the parts broken away;

Fig. 3 is a view in cross section, taken on approximately line 3—3 of Fig. 2;

Fig. 4 is a detail view in front elevation of the imprinting unit after cover is removed;

Fig. 5 is a detail view taken substantially along the line 5—5 of Fig. 4;

Fig. 6 is a detail view taken along line 6—6 of Fig. 4;

2

Fig. 7 is a detail view in longitudinal section, taken substantially along the line 7—7 of Fig. 4;

Fig. 8 is a view in front elevation of the ribbon reversing mechanism, shown in alternate position with respect to the showing of Fig. 4, taken on line 8—8 of Fig. 3;

Fig. 9 is a view similar to Fig. 8, showing the mechanism in a later stage of operation.

Like parts are indicated by similar characters of reference throughout the several views.

Referring to the drawings, the invention is disclosed as embodied in an autographic register, provision being made for use of the register in the conventional manner of such device as well as with the present roll imprinter.

As shown in Fig. 1, the register includes a case 19 to one end of which is hinged a lid 21. The lid 21 has a central longitudinal opening 22 exposing the record forms 23 and further has a transverse opening 24 receiving an imprinting unit 25. The record forms 23 lie on a writing table 26 pivotally connected to brackets on the case 19. The table 26 and lid 21 are connected to the case 19 at opposite ends thereof so that they may be lifted to an upright position in order to gain access to the interior of the case.

The record forms 23 comprise a manifold assembly made up of a plurality of record strips and interleaved carbon strips, the several strips having transverse, weakened division lines space apart distances corresponding to the length of the individual forms. The strips are folded in the form of a pack contained in the case 19 at the rear thereof. The leading end of the strip is passed around an idler roll and extended forwardly over the table 26, the first record form being thus presented in a recording position within opening 22. Advancement of the record strip assembly, which has marginal perforations 31, is accomplished by pin wheels 32 secured to a transverse shaft 33 and having radial pins 34 engageable with the marginal perforations in the record forms. The shaft 33 is journaled between the side walls of the case 19, and, outside the case, has a crank arm 35 secured thereto. Operation of the crank arm 35 turns the shaft 33 to advance the forms, the parts being ordinarily constructed and arranged so that one complete turn of the crank arm advances one set of forms out of recording position and brings the succeeding set into recording position. A flutter plate 36 mounted on the front end of the writing table occupies a predetermined interleaved relation with the record strips. As an inscribed set of forms is ejected, therefore, some are guided out of the machine for detachment from the strip while others are directed into a locked storage compartment 37 in the front of the case 19.

The record forms are advanced beneath the imprinting unit 25 which normally occupies a position overlying the shaft 33, being secured to the free ends of a pair of arms 38 and 39 (Fig. 3) connected at their opposite ends to a shaft 41 journaled between the side walls of the case 19. The shaft 41 is spaced forwardly of the shaft 33 whereby the unit 25 may be swung on the arms 38—39 upwardly and forwardly out of operating position for inspection purposes or to permit the table 26 to be raised.

Referring to Figs. 3 and 4, the unit 25 includes mating cover members 42 and 43. To the inner wall of member 43 are fastened brackets 44 and 45 defining respective attachment points for the arms 38—39. Also attached to the inner wall of member 43 is a generally rectangular frame 46, the bottom of which is open and in slightly projecting relation to the bottom of cover members 42 and 43. The unit 25 tends by its own weight to drop downward upon the table 26. Thus, the engagement of the projecting frame 46 with the record strip on the

3

table 26 may be utilized as a hold down means to keep the record forms engaged with the feeding pins 34 when the forms are in recording position. The imprinting unit 25 thus performs the function of the hold down bar conventionally found in autographic registers. As an aid to the performing of this function, the opposite ends of the frame 46 are formed with the so-called "feed-fingers" 47 which extend in embracing relation to the feeding pins 34.

So that the record forms may be advanced without interference from the imprinting unit, the latter is lifted slightly at the start of the form advancing operation to disengage the frame 46 from its hold down position. In the carrying out of this function, each pin wheel 32 has integral therewith a disc 43 presenting a peripheral notch 49. Mounted on the arms 38—39 are rollers 51 each cooperable with a respective disc 48. At the completion of a cycle of operation of the shaft 33, during which one set of forms has been ejected and another brought into recording position, the rollers 51 drop into the notches 49 whereby frame 46 is allowed to press the record forms upon the writing table 26. At the start of a form advancing operation, however, the rollers 51 ride up out of the notches 49 and so lift the imprinting unit and frame 46 therein to a position where free movement of the forms is unimpeded. The imprinting unit remains so elevated throughout the form advancing cycle of operation of the shaft 33.

In the further construction of the unit 25, the sides of the frame 46 define guides 52a for an inked ribbon 52 which extends across the open bottom of the frame 46. The ends of the ribbon 52 are attached to respective spools 53 to the inner end of each of which is detachably secured a ratchet 55. The spool and ratchet assemblies are mounted for rotary motion upon the brackets 44 and 45. The ratchets 55 are turned by respective pawls 56 and 57 pivotally mounted on opposite ends of a slide 58 and urged by spring 58a (Fig. 8) into engagement with their ratchets. The slide 58 has pins 59 received in slots 61 in a ribbon actuator 62, the slide 58 and actuator 62 being arranged in side by side relatively reciprocating relation (Figs. 6—7). A pawl 63 (see Figs. 4—8—9) is pivotally mounted on the actuator 62 and is urged by a spring 64 into contact with the upper edge of the slide 58 where it is engaged alternately with notches 65 and 66. The shifting of the pawl 63 from engagement with one notch 65 or 66 to the other involves a relative axial movement of the slide 58 to move one pawl 56 or 57 more closely to its respective ratchet 55 and to move the other pawl correspondingly away from its ratchet 55. As will be understood, the described structure pertains to a ribbon reverse operation wherein the positive drive of the ribbon spools may be transferred from one to another.

The ribbon actuator 62 (Figs. 4—6) is mounted on a bracket 67 fixed to the top of the frame 46, the actuator having pins 68 received in slots 69 in the inner upstanding wall of the bracket 67 which is substantially channel shaped. Extending through the slots 69, the pins 68 have roller heads 71 thereon. The opposite or outer wall of bracket 67 extends upwardly beyond the actuator 62 and slide 58. At its upper end it provides, together with the cover member 43, a bearing for a shaft 72 (Fig. 7). Intermediate its ends the shaft 72 has an arm 73 secured thereto which lies in the plane of the roller heads 71. Adjacent its ends the shaft 72 has secured thereto respective arms 74 which extend downwardly on opposite sides of the frame 46. The lower or outer ends of the arms 74 are bifurcated and engage the opposite ends of a shaft 75 which extends through elongated slots 76 in the frame 46, the opposite ends of the slots 76 being turned upward. Mounted on the shaft 75 and riding in each slot 76 are small guide rollers 77. Also mounted on the shaft, within the frame 46, is a relatively larger roller 78. The roller 78 is in overlying

4

relation to the inked ribbon 52 (Fig. 4) which extends across the open bottom of the frame 46 between guides 52a. The dimensions of the roller 78 and the location and dimensions of the slots 76 are such that movement of the roller through the frame 46, as guided by rollers 77 in slots 76, results in the roller applying pressure through the ribbon 52 upon the underlying record forms. As the roller 78 approaches the end of the frame 46 (Fig. 8) this pressure is relieved, the guide rollers 77 riding upward into the inclined ends of the slots 76. The roller 78 is caused to traverse the ribbon 52 in the manner just referred to by a rocking motion of the shaft 72, this motion being manually initiated by means of a crank arm 79 attached to the shaft 72 outside the cover assembly (Figs. 1 and 7). The crank arm 79 is loosely mounted on the shaft 72 with a hub 81 thereof circumferentially cut away to provide spaced abutment surfaces 81a (Fig. 4) alternately engageable with a pin 82 on one of the arms 74.

In conjunction with the spaced abutment surfaces of flats 81a, there is a detent 72a formed by a flange on shaft 72 as seen in Figs. 4 and 8. The flange is adjacent bracket 67 and serves as a bearing for shaft 72 in bracket 67. This flange includes a pair of radially spaced axial notches 72b which serve as latching seats for the latch 72c. The spaced apart notches are located so that when the crank arm 79 is horizontal as in Fig. 8, the latch 72c engages the left notch to retain the roller 78 in the inclined terminal of the slots 76 at the right. Similarly in the reverse position of the crank arm, the other notch will be engaged for holding the roller raised at the left. The latch 72c is spring urged in a clockwise direction to bear against the detent 72a. In this manner the roller 78 is maintained in elevated position relative to the ribbon during register operation as a precaution against the outfolds of the strip snagging the pressed down ribbon.

To effect an imprinting operation, the crank arm 79 is grasped and swung a distance of 180° from the position shown in Fig. 1 to the position shown in Fig. 2. In the course of such motion, the hub 81 picks up the pin 82 and the assembly of parts including shaft 72, arm 73 and arms 74 begins to rock, in the illustrated instance in a clockwise direction. Roller 78 is caused at once to move and presses through the ribbon 52 upon the record forms. The initial motion of the arm 73 is without effect. Near the end of the permitted motion, however, as the guide rollers 77 reach the inclined terminal of the slots 76, the arm 73 engages a head 71 and moves the ribbon actuator 62 transversely of the register, or to the left in the example considered. By reason of the engagement of the pawl 63 in a notch 65 or 66, the slide 58 is caused to partake of the movement of the ribbon actuator, and the pawl 56 or 57 is moved to engage its ratchet 55 and impart an increment of motion to the respective spool 53. The ribbon 52 accordingly is advanced a step at about the same time the roller 78 is lifted by the cam slots 76 from pressural contact therewith.

In connection with the ribbon reverse mechanism, referring to Fig. 4, completion of a clockwise movement of the crank arm 79 would not effect any change but merely place the arm in the position of Fig. 2. With the right hand spool 53 completely unwound, the ribbon 52 is held tight across the guides 52a by the winding spool at the left and further advancement of the ratchet 55 prevented. Therefore as the actuating arm 73 struck the stud 68 to shift the actuator plate 62 to the left, the slide 58 which carries the pawls 56—57 could not partake of the corresponding movement as the ratchet 55 arrests the pawl 56. Consequently, the pawl 63 movable with the actuator 62 is forced out of the notch 66 and urged by spring 64 to fall into notch 65. The slide 58 will then be movable together with the actuator 62 in a readjusted position offset to the right as seen by the location of the carrier pins 59 in slots 61. Thus in the following operations of

the arm 79, successive counter-clockwise motion will extend the slide 58 and its pawls 56—57 more to the right than to the left.

Accordingly on the immediately following operation of the arm 79 after the disclosure in Fig. 4, the actuating arm 73 strikes the right hand stud 68 as in Fig. 8. The actuator 62 carries the pawl 63 and by its engagement in notch 65 pushes the slide 58 so that pawl 57 advances the right hand ratchet 55 whose spool 53 rewinds the ribbon 52 in a clockwise direction. On the return motion of the arm 79 pawl 56 falls short of engagement with the ratchet 55 so that the left hand spool is not driven and unwinds as the ribbon is advanced. This action occurs until the left hand spool is completely unwound.

The disclosure in Fig. 8 represents the moment the right hand spool has been arrested by the ribbon now drawn tight by reason of the unwound supply at the left hand spool. Consequently the next counterclockwise operation of the arm 79 will shift the actuator 62 in the manner disclosed in Fig. 9. However, the pawl 57 has been arrested by the ratchet of the right hand spool, so that the slide 58 could not shift with the actuator 62, and instead remains stationary relative thereto.

Therefore, the pawl 63 carried on the actuator 62 is forced out of notch 65 and received in notch 66. At this time, the slide 58 is again readjusted relative to the actuator and offset to the left thereof as seen by the pins 59 now at the left of slots 61. In subsequent movements of the actuator to the left, slide 58 will be extended further to the left than to the right for the pawl 56 to advance the ratchet of the left spool while the pawl 57 fails to engage the ratchet of the right hand spool. Thus, in the clockwise operation of the arm 79, immediately following that in Fig. 9 the ribbon will be rewound on the left hand spool until such time as the right hand spool is unwound completely as in Fig. 4. The pawl 63 is then again re-seated in notch 65 to assume the relationship and action represented in Fig. 4.

The ratchets 55 have detent pawls 83 pivotally mounted on the brackets 44 and 45 and urged by springs 84 into engagement with the ratchets 55 to prevent retrograde movement thereof. The pawls 83 have integral arms 85 adapted to be depressed to disengage alternate pawls from their respective ratchet so that the associated spool will be released for following movement with respect to the other spool. Such disengagement of the pawls 83 is accomplished by lever 86 having a fixed pin 86a seen best in Fig. 7. The pin 86a comprises a shoulder by which the lever 86 is pivotally supported in the slide 58 and a head extending beyond the actuator 62 into the slot 67a of the bracket 67 (Figs. 4-8-9). The head of pin 86a retains the lever 86 in side by side relation with the slide 58 but affords pivotal relationship thereto. Thus, the movable slide 58 carries the lever 86 and the head of pin 86a supplements the supporting pins 59 of the slide 58 in actuator slots 61 by sliding in the slot 67a. For this reason the bottom of the actuator 62 is notched out as clearance when the combined lever 86 and slide 58 are readjusted relative to the actuator 62 by the reversible pawl 63 in notches 65—66.

Substantially oppositely extending arms 87 and 88 on the lever 86 overlie arms 85 on the pawls 83. The upper edge of lever 86 lies parallel to and extends substantially across the notches 65 and 66. Further, an abutment shoulder 89 on the upper edge of the lever lies in cooperative relation with the pawl 63. Movement of the pawl 63 into the notch 66 causes the pawl to engage abutment shoulder 89 and rock the lever 86 in a clockwise direction with the result, that the right hand pawl 83 is disengaged from its respective ratchet 55. The opposite effect is gained by movement of the pawl 63 into notch 65, in the course of which motion it engages the upper edge of the lever and rocks it in a counterclockwise direction to the position of Fig. 4 or 8.

According to the illustrated embodiment of the inven-

tion, the imprinting unit 25 acts in conjunction with an embossed printing plate 91 (Fig. 5). The imprinting unit achieves cooperation with the plate 91 through an opening 92 in the writing plate or table 26, the printing plate being brought to registry with such opening, on the underside of the table, by carrier assembly 93. The carrier assembly occupies a normal position in a cut-out 94 in the lid 21 where it is accessible for placement and removal of the plate 91. In the operation of the plate carrier, a handle 94' thereon is grasped and swung from the position of Fig. 2 to a position where the plate 91 is aligned with the opening 92 in the writing table 26.

In this disclosure the imprinting unit 25 cannot be removed from imprinting position without raising the lid 21. This was accomplished by having long "feed fingers" 47, which project beyond the opening 24 as in Fig. 3.

In loading the register the lid 21 is swung upward and back until the opening 24 is removed from embracing relation to the hinged imprinting unit 25. In doing this the operating arm 79 is positioned vertically, or anywhere within the width of the record opening 22.

The arm 79 secured on the shaft 72 by means of a screw is readily demounted so that unauthorized use or tampering is prevented. Another reason for removal of the arm 79 is in conjunction with servicing such as renewing the ribbon. In this instance, additional screws 42a in Figs. 1 or 3 are removed so that the cover section 42 can be slipped off the spools 53. The spools can then be removed from the supporting pin fixed in brackets 44—45. So removed, the ratchets 55 can be seen, as in Fig. 4, for inspection or servicing.

Details of the plate carrier and other aspects of the autographic register which provides a physical embodiment for the invention, such as an interlock between the plate carrier assembly and the form feeding mechanism and means for accomplishing two imprinting impressions on a single set of forms, are more fully disclosed and claimed in applicant's copending parent application, previously identified.

From the above description it will be apparent that there is thus provided a device of the character described possessing the particular features of advantage before enumerated as desirable, but which obviously is susceptible of modification in its form, proportions, detail construction and arrangement of parts without departing from the principle involved or sacrificing any of its advantages.

While in order to comply with the statute the invention has been described in language more or less specific as to structural features, it is to be understood that the invention is not limited to the specific features shown, but that the means and construction herein disclosed comprise but one of several modes of putting the invention into effect, and the invention is therefore claimed in any of its forms or modifications within the legitimate and valid scope of the appended claims.

Having thus described my invention, I claim:

1. In an imprinting mechanism, an inking ribbon, oppositely disposed spools in which said ribbon is wound, ratchets on said spools, a reciprocable pawl carrier having opposite ends extending toward respective spools, pawls on said ends engageable with respective ratchets, a reciprocable actuating member providing a mount for said carrier, and means for effecting limited reciprocating motion of said member, said carrier being mounted on said member for intermittent feeding engagement with one only of said spools in response to reciprocation of said actuating member, the mounting for said carrier on said actuating member including a pin and slot connection therebetween for relative positioning of said carrier to select said spools for feeding, and further including a detent connection having plural detenting positions, said member moving relatively to said carrier to change the effective detenting position in response to predetermined resistance by said inking ribbon to advance.

7

2. In a roll imprinting mechanism, a housing, an inking ribbon, spaced apart spools supported by said housing on which said ribbon is wound, a roller device movable to traverse the ribbon between said spools for imprinting, feeding mechanism for advancing one of said spools for advance of the ribbon, said feeding mechanism including a reciprocable feeding element selectively positionable to advance one or the other of said spools by its reciprocating motion, and apparatus operable by said roller device for reciprocating said feeding element, said apparatus comprising a reciprocable means operated by said roller device and a detent connection between said reciprocable means and said feeding element including a pawl on one thereof and spaced apart notches on the other thereof, interrupting of the travel of said ribbon in one direction restraining said feeding element for relative movement of said reciprocable means to move said pawl out of engagement with one notch and into engagement with another notch.

3. An imprinting unit for pressing an inking ribbon upon a record form or the like, comprising a pair of spools upon which said ribbon is wound, opposite ends of said ribbon being fixed to opposite spools, structure positioning a length of said ribbon intermediate said spools for contact with the record form, a roller reciprocable longitudinally along said length of ribbon to press said ribbon upon the record form, manually operable means for reciprocating said roller, and ribbon advancing means responsive to said manually operable means

8

including a ribbon actuating member supported for reciprocal movement between said spools and driven reciprocally by said manually operable means, a spool engaging member mounted for reciprocal sliding movement on said ribbon actuating member and having two positions on said actuating member, one for feeding engagement with each of said spools, said spool engaging member shifting from one position to the other when encountering resistance to rotation of the spool engaged thereby, and detent means operating between said members yieldingly securing said spool engaging member alternatively in one of its two positions relative to said ribbon actuating member.

References Cited in the file of this patent

UNITED STATES PATENTS

546,427	Norcross	Sept. 17, 1895
1,247,305	Marbach	Nov. 20, 1917
1,937,145	Gollwitzer	Nov. 28, 1933
1,945,264	Dugdale	Jan. 30, 1934
2,150,401	Scheel	Mar. 14, 1939
2,295,748	Moore	Sept. 15, 1942
2,592,706	Julius	Apr. 15, 1952
2,664,819	Janke	Jan. 5, 1954
2,692,555	Gruver	Oct. 26, 1954
2,782,714	Davidson	Feb. 26, 1957