March 27, 1956 C. J. HUEBER ET AL 2,739,533

INTERMITTENT WEB FED MEANS FOR ROTARY PRINTING MACHINES

Filed April 6, 1951 6 Sheets-Sheet 1

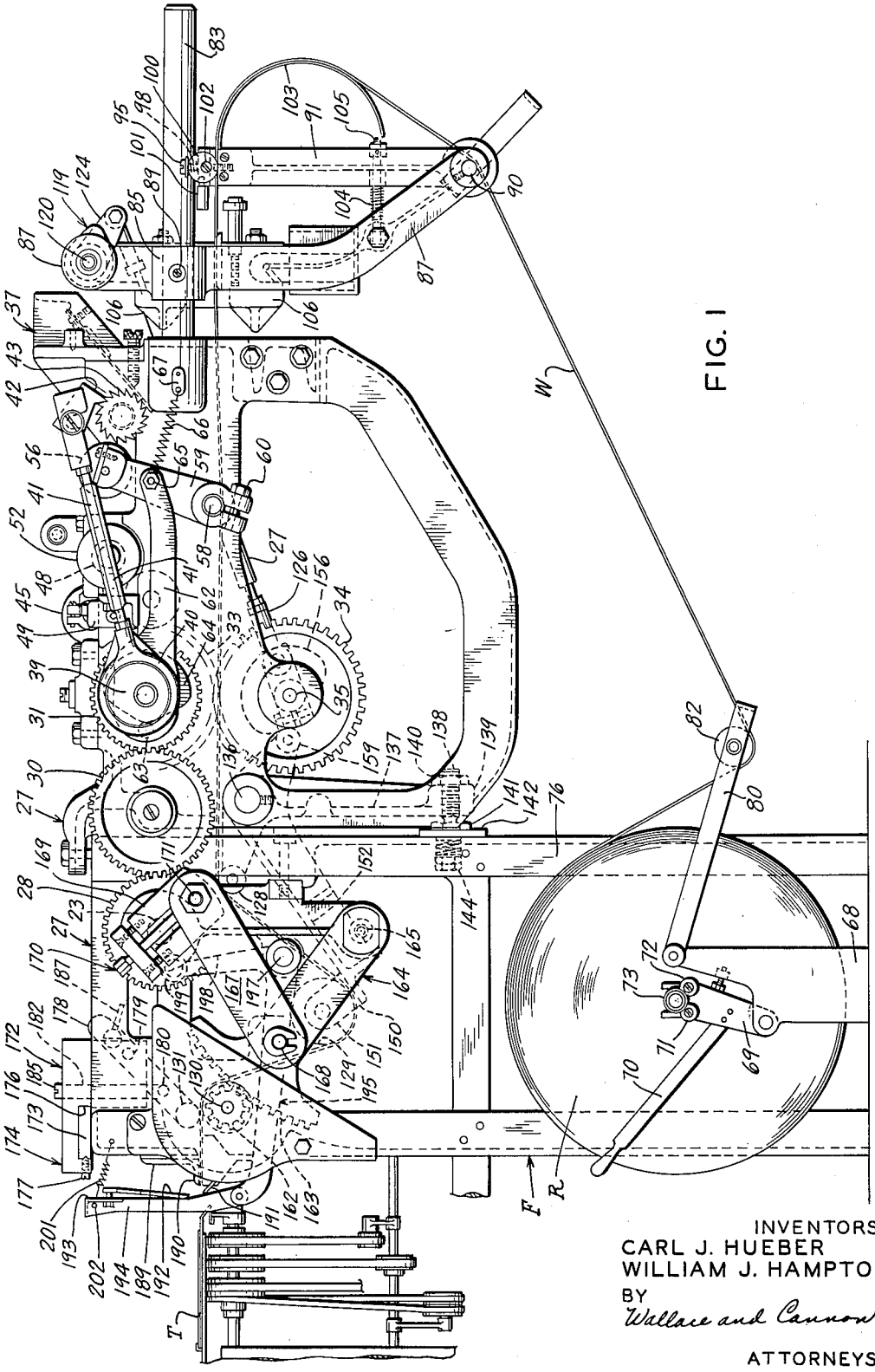


FIG. 1

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Filed April 6, 1951 6 Sheets-Sheet 2

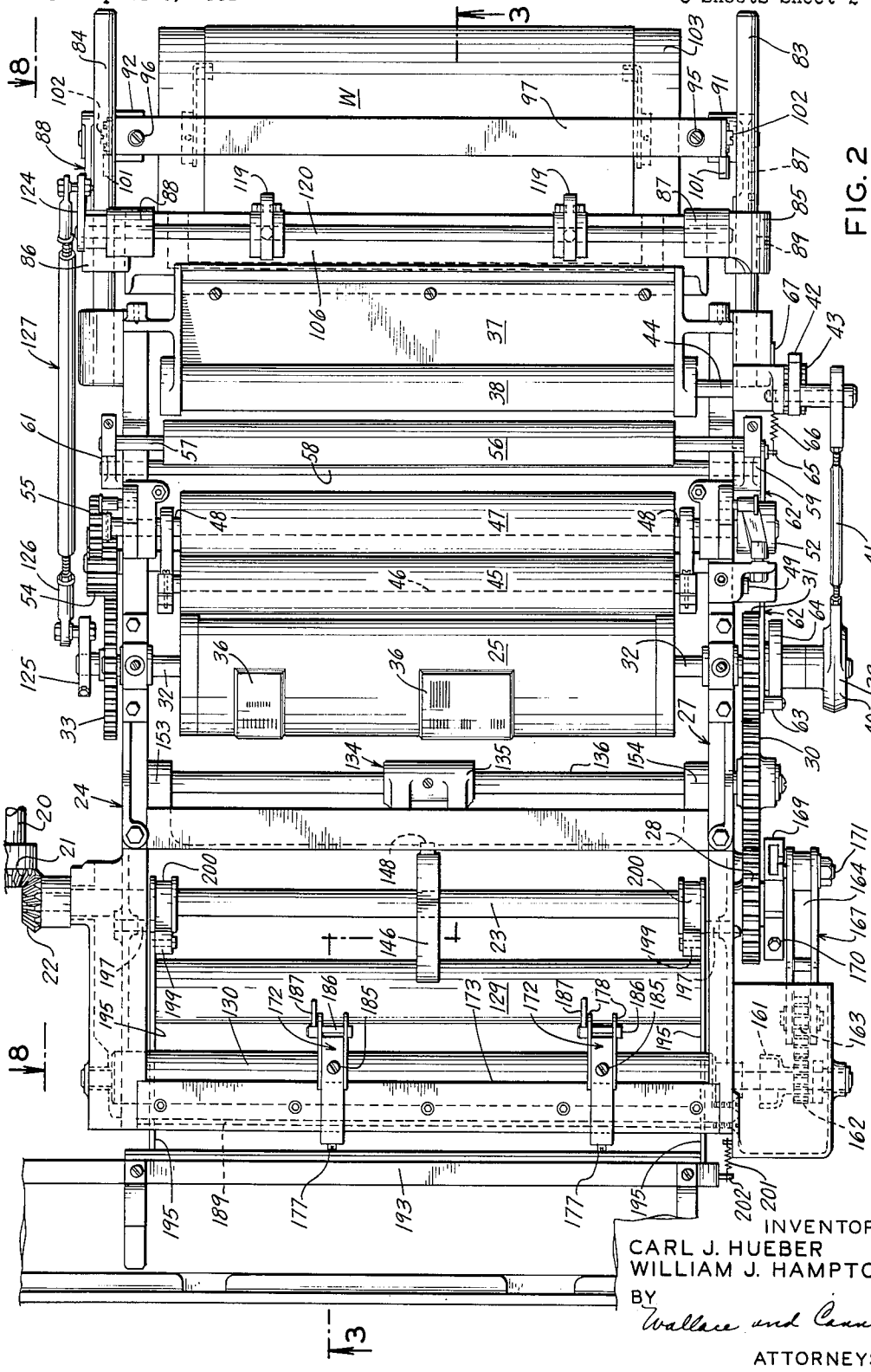


FIG. 2

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INTERMITTENT WEB FED MEANS FOR ROTARY PRINTING MACHINES

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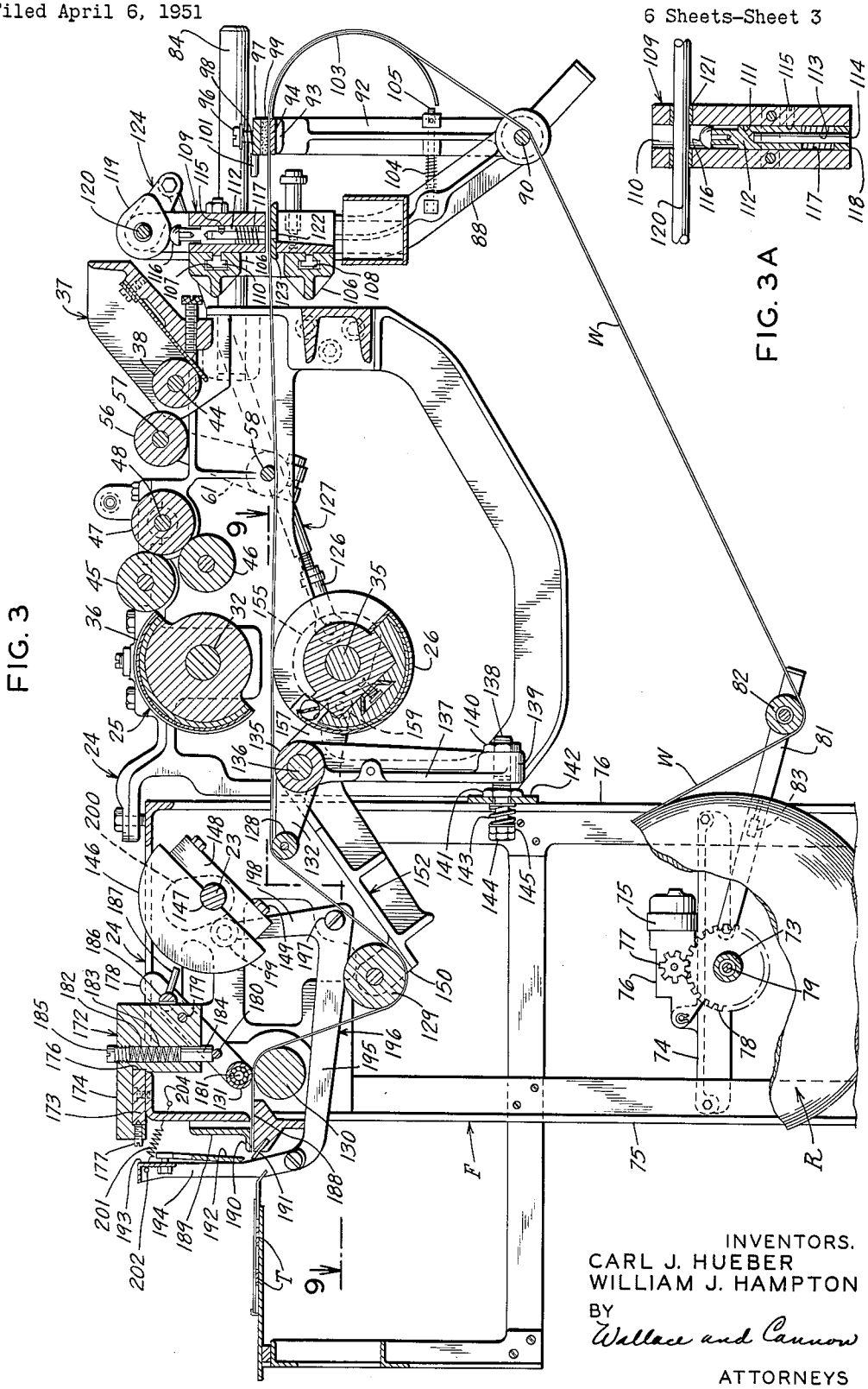


FIG. 3

FIG. 3A

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FIG. 4

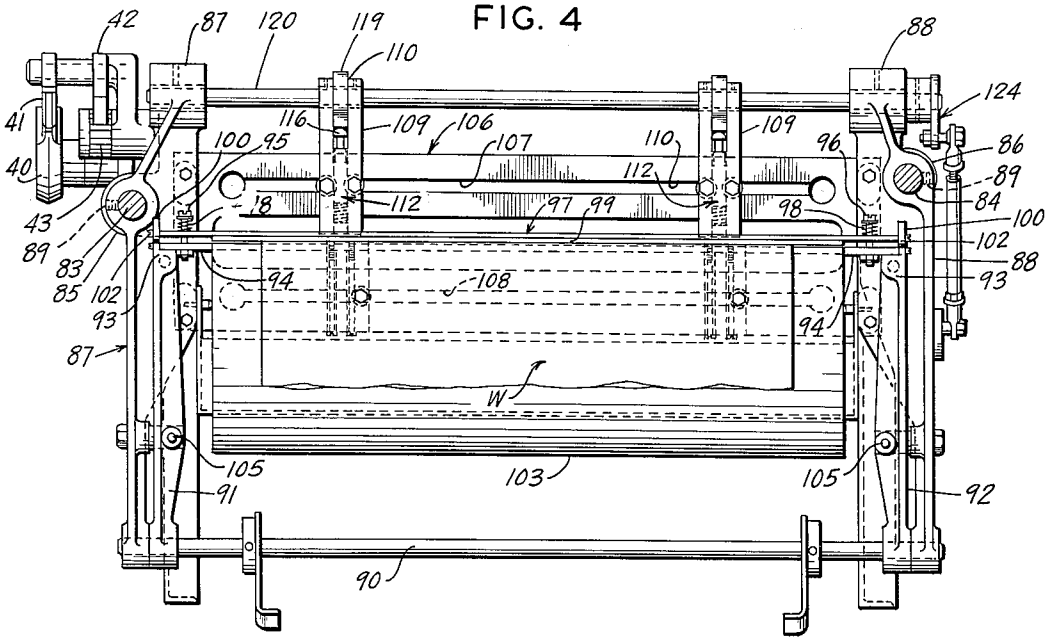
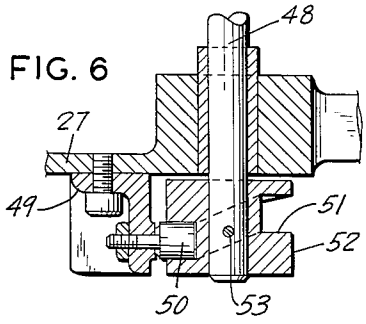


FIG. 6



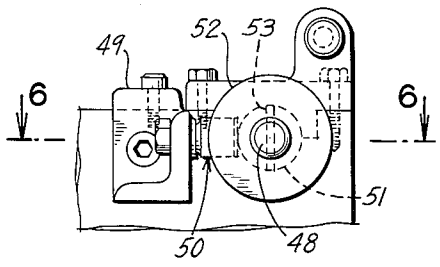


FIG. 5

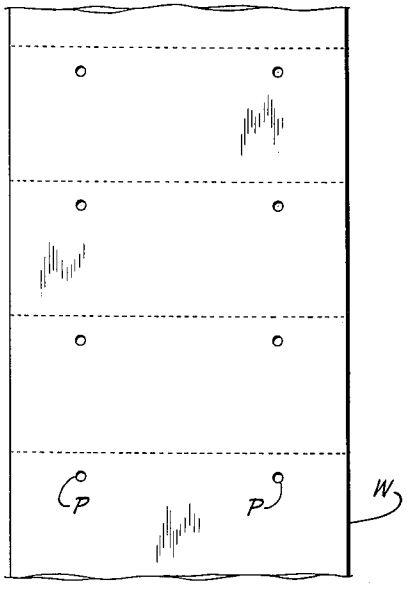


FIG. 7

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INTERMITTENT WEB FED MEANS FOR ROTARY PRINTING MACHINES

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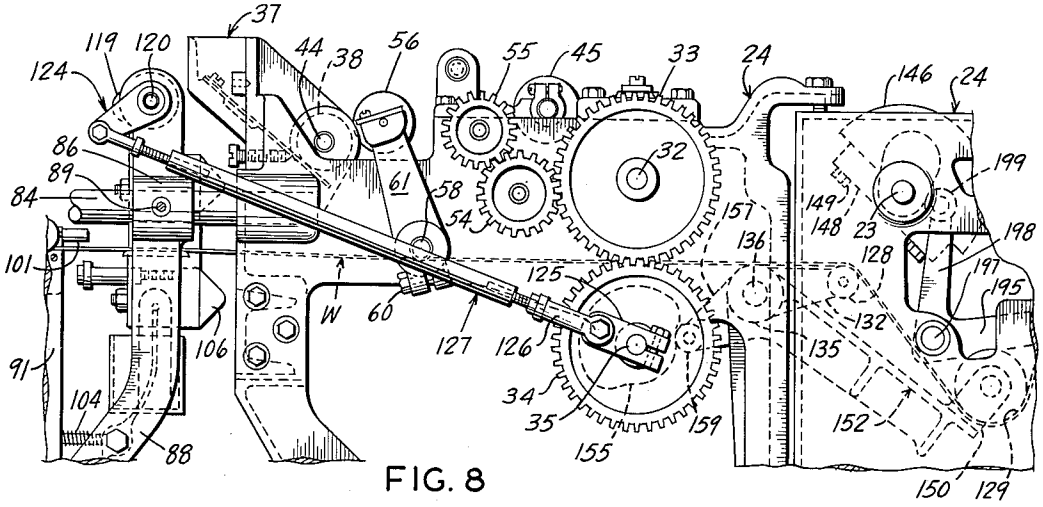


FIG. 8

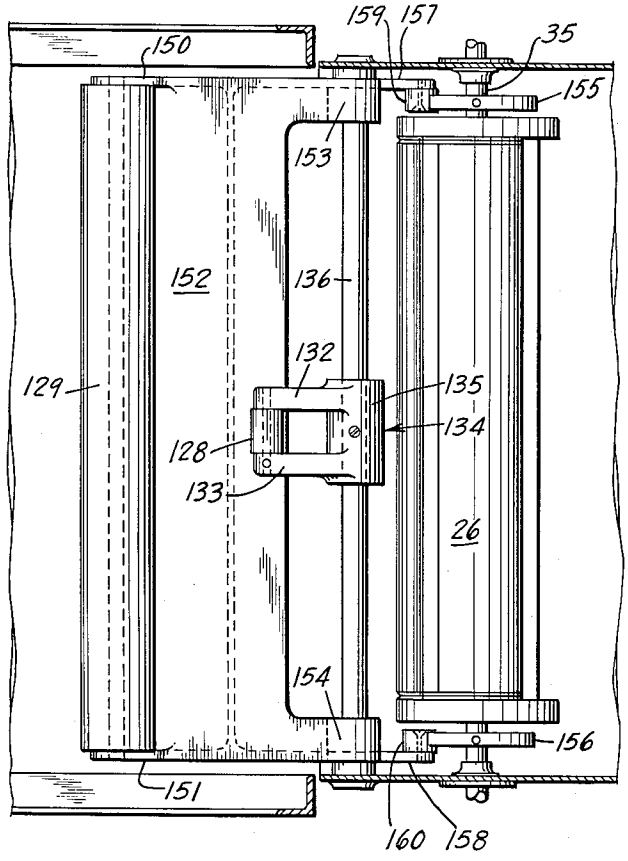


FIG. 9

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INTERMITTENT WEB FED MEANS FOR ROTARY PRINTING MACHINES

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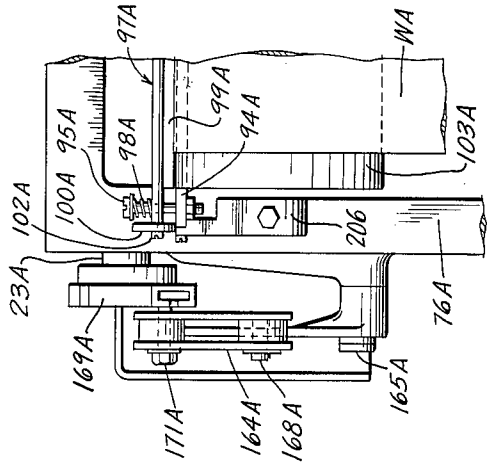


FIG. 11

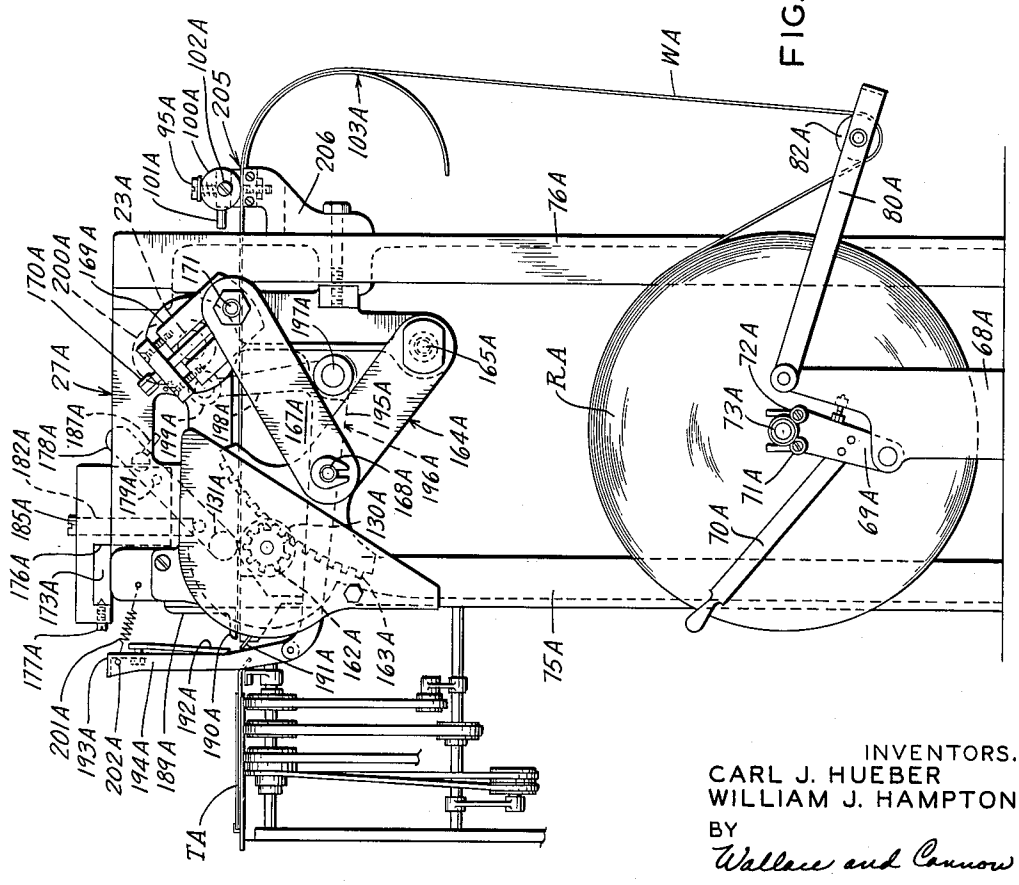


FIG. 10

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United States Patent Office 2,739,533 Patented Mar. 27, 1956

2,739,533

INTERMITTENT WEB FED MEANS FOR ROTARY PRINTING MACHINES

Carl J. Hueber, Euclid, and William J. Hampton, South Euclid, Ohio, assignors to Addressograph-Multigraph Corporation, Wilmington, Del., a corporation of Delaware

Application April 6, 1951, Serial No. 219,586

4 Claims. (Cl. 101—227)

This invention relates to printing machines and especially to those adapted for imprinting public utility bills, insurance notices, and similar business instruments.

While a great many business instruments of the aforesaid character are imprinted on relatively light paper, there has recently come into vogue the practice of using postcards which are produced from relatively thick paper or card stock. Many such cards have data representing perforations formed therein so as to render the cards suitable for use in machines effecting calculating operations. Such data perforations must be accurately located in the particular card which itself must be quite accurate dimensionally.

The machine of this invention may be utilized to produce cards of the aforesaid nature. The paper or card stock from which the cards are to be produced is wound on a roll, the width of which is equal to the desired length of the business instruments to be produced. The web is divided at intervals to thereby afford the cards.

One of the primary objects of our invention is to direct a web of paper or the like that is to be divided into business instruments directly to the means that are to be effective to divide the web into sections or business instruments and to so arrange the apparatus that the web will be directed over a minimum of curved surfaces in passing to the means that are effective to divide the same into sheets or business instruments.

Business instruments of the aforesaid character often have holes punched therein, for example, to enable the same to be bound together in a ring binder or the like. Such perforations are located in a wide variety of locations or positions on the business instruments and, therefore, another object of this invention is to afford means effective to produce perforations of the aforesaid character in business instruments prior to the time such business instruments are separated from the web of paper or the like affording the same, and to so arrange the perforating means that a perforation or perforations may be located at any desired position or positions on the business instruments, and an ancillary object is to arrange the perforating means so that it is capable of adjustment both transversely and longitudinally of the section of the web that is to afford the business instrument.

Oftentimes an imprint is made on business instruments of the aforesaid character, and it is desirable that such imprint be accurately located with respect to the margins of the business instruments, and to enable such imprinting to be effected is yet another object of this invention.

In the apparatus that has heretofore been utilized to produce business instruments from a web of paper as aforesaid, the printing and related mechanisms were located between side frames while the means for effecting operation of such mechanisms were located exteriorly of the frame, and often in overhanging relation with respect to the adjacent frame member. Also arrangements of the aforesaid character have included operating means that were driven from means adapted to operate on the web, and the arrangement has been such that such operating means were subjected to distortion by reason of the driving of another mechanism therefrom, and in view of this, it is still another object of this invention to drive the various operative mechanisms of the apparatus one from the other in such a way that none of the operative mechanisms will be placed under strain.

We have found that the above set forth objects can best be realized by placing the web under tension during the time the same is passing through our apparatus so that the web will not be free to shift in a longitudinal direction, and to enable this to be effected is a further object of this invention.

Other and further objects of the present invention will be apparent from the following description and claims and are illustrated in the accompanying drawings which, by way of illustration, show preferred embodiments of the present invention and the principles thereof and what we now consider to be the best mode in which we have contemplated applying these principles. Other embodiments of the invention embodying the same or equivalent principle may be used and structural changes may be made as desired by those skilled in the art without departing from the present invention and the purview of the appended claims.

In the drawings:

Fig. 1 is a side elevational view of our novel apparatus and showing portions of the machine in which it is associated;

Fig. 2 is a plan view of our apparatus;

Fig. 3 is a longitudinal sectional view taken substantially on the line 3—3 on Fig. 2;

Fig. 3A is a sectional detail view of the web perforating mechanism;

Fig. 4 is a rear elevational view of our apparatus;

Fig. 5 is a detail view showing an arrangement that is effective to impart a reciprocatory motion to an operative element in our apparatus;

Fig. 6 is a sectional detail view taken substantially on the line 6—6 in Fig. 5;

Fig. 7 is an elevational view of the web that is to be divided into sections that are to afford business instruments;

Fig. 8 is a side elevational view taken substantially on the line 8—8 on Fig. 2;

Fig. 9 is a plan view taken substantially on the line 9—9 on Fig. 3;

Fig. 10 is a side elevational view of another embodiment of our invention; and

Fig. 11 is a fragmentary rear elevational view of the apparatus shown in Fig. 10.

Our novel apparatus is advantageously incorporated in a printing machine of the kind shown in Patent No. 2,041,183, patented May 19, 1936, and in the accompanying drawing 20, Fig. 2, indicates the main drive shaft of such a machine. This drive shaft carries a bevel gear 21 that meshes with a bevel gear 22 fast on the main drive shaft 23 of our novel apparatus, the shaft 23 extending exteriorly of the side frame member 24 and the bevel gear 22 is mounted on the portion of the shaft that is so extended.

Our apparatus is arranged to imprint the web of paper or card stock passed therethrough, and to this end, a printing couple including an impression cylinder 25 and a platen cylinder 26 is provided. These cylinders are mounted between the side frame member 24 and the other side member 27 and are driven from the drive shaft 23. Thus, a portion of the drive shaft 23 extends exteriorly of the side frame member 27 and the gear 28 is fast thereon. A stub shaft 29 is mounted on the side frame member 27 and carries a gear 30 that meshes with the gear 28 and also with a gear 31 fast on the shaft 32 of the impression cylinder. Another gear 33 is mounted on

the shaft 32 exteriorly of the side frame member 24, and this gear meshes with a gear 34 fast on the shaft 35 of the platen cylinder. Hence, when the drive shaft 23 is in operation, the printing couple 25 is rotated and electrotypes as 36 on the impression cylinder 25 are effective to imprint the web of paper that is passed between the elements of this printing couple.

An ink fountain 37 is provided which has a roller 38 disposed therein at the lower forward end thereof. A step-by-step movement is imparted to this roller to make the same effective to withdraw ink from the ink fountain 37. In order to impart a step-by-step movement to the roller 38, an eccentric 39 is mounted on the shaft 32 outwardly of the gear 31 fast on this shaft. A strap 40 is disposed about the eccentric 39 and is connected to an arm 41 which advantageously includes an arrangement to adjust the length thereof. A pawl 42 is mounted at the free end of the arm 41 and cooperates with a ratchet 43 fast on the shaft 44 that carries the roller 38. Hence, when the impression cylinder is in operation, the pawl 42 is effective on the ratchet 43 to impart a step-by-step movement to the shaft 44 and the roller 38.

Form rollers 45 and 46, Fig. 3, are supported between the side frame members 24 and 27 and are disposed in position to engage the printing elements as the electrotypes 36 in the course of rotation of the impression cylinder 25 to thereby supply ink to these printing elements. In order to insure that the ink will be uniformly distributed over the form rollers 45 and 46, a vibrator roller 47 is provided which is mounted on a shaft 48 that has opposite ends thereof respectively journaled in the side frame members 24 and 27. A reciprocatory movement is imparted to the vibrator roller 47 so that it slides along the peripheries of the form rollers 45 and 46. Such reciprocatory movement is imparted to the roller 47 by the apparatus illustrated in detail in Figs. 5 and 6. Thus, a bracket 49 is mounted on the outer face of the side frame member 27 and carries a roller 50 that is disposed in a cam groove 51 in the cylinder 52 which, it will be noted, extends in angular relation with the axis of the shaft 48 to which the cylinder 52 is connected as by the pin 53. When rotative movement is imparted to the shaft 48 and the roller 47, the roller 50 in the cam groove 51 causes the shaft 48 to reciprocate axially.

Rotative movement is imparted to the vibrator roller 47 from the gear 33 fast on the shaft 32 exteriorly of the side frame member 24. As best shown in Fig. 8 the gear 33 meshes with the gear 54 mounted on the stub shaft carried by the side frame member 24. The gear 54 in turn meshes with the gear 55 fast on the shaft 48 exteriorly of the side frame member 24. Hence, when the main cam shaft 23 is in operation, rotative movement is imparted to the vibrator roller 47 carried by the shaft 48. By referring to Fig. 2, it will be noted that the gear 54 is substantially wider than the gears 33 and 55 meshed therewith. The gear 54 is so increased in thickness in order to insure that it will remain in mesh with the gears 33 and 55 during the reciprocatory movement imparted to the roller 47 in the manner described hereinabove.

Ink is transferred from the pickup roller 38 to the vibrator roller 47 by the ductor roller 56. The ductor roller 56 is carried by a shaft 57 which extends above and exteriorly of each of the side frame members 24 and 27. Another shaft 58 extends between and exteriorly of the side frame members 24 and 27. An arm 59 having a bifurcated end portion is mounted on the shaft 58 outwardly of the side frame member 27, the bifurcated end portion being tightly clamped to the shaft 58 by the bolt 60. An arm 61, Fig. 8, is mounted on the shaft 58 exteriorly of the side frame member 24 and in the same way that the arm 59 is mounted on the shaft. The end portions of the shaft 57 of the ductor roller 56 are respectively mounted in the upper ends of the arms 59 and 61. Rocking movement is imparted to the arms 59 and 61 and the end of such movement in one direction engages the ductor roller 56 with the pickup roller 38 while the end of such movement in the other direction engages the ductor roller 56 with the vibrator roller 47.

Rocking movement is imparted to the arms 59 and 61 from the impression cylinder shaft 32 through an arm 62, Figs. 1 and 2. This arm 62 has a slot (not shown) formed therein through which the shaft 32 is extended. A roller 63 is mounted on one end of the arm 62 and rides on the periphery of the cam 64 mounted on the shaft 32. The other end of the arm 62 is pivotally connected to the arm 59 as indicated at 65. A spring 66 extends between the arm 59 and the spring anchor 67 on the side frame member 27. The spring 66 is effective to urge the roller 63 toward the periphery of the cam 64 which embodies a configuration such that a reciprocatory movement is imparted to the arm 62. The spring 66 is also effective to urge the ductor roller 56 into engagement with the pickup roller 38. A timed relation is established between the operation of the ductor roller 56 and the step-by-step movement imparted to the roller 38 so that the ductor roller 56 is in engagement with the pickup roller 38 during the time movement is being imparted to the roller 38. The configuration of the cam 64 is such that after the roller 56 has been in engagement with the roller 38 for a predetermined length of time it is then effective to move the ductor roller 56 from engagement with the roller 38 and into engagement with the vibrator roller 45 and in this way, ink picked up from the roller 38 by the ductor roller 47 is transferred to the vibrator roller 45 from which it is transferred to the form rollers 45 and 46.

The printing couple is effective to make impressions in spaced apart relation on a web W which is withdrawn from a roll R. The width of the web W is equal to the length desired in the sheets or business instruments to be severed therefrom. Two uprights as 68 are rested upon the floor in spaced apart relation and have arms at 69 pivotally connected thereto, a lever 70 being provided to facilitate rocking movement of the arms at 69. The arms as 69 include spaced apart rollers 71 and 72 that are mounted so as to slightly overlap the bight of the bifurcated end portion of each arm 69 so that when the outwardly extending end portions of the spindle 73 are disposed in the bifurcated end portions, spindle 73 rests on the rollers 71 and 72 to thereby assure free rotative movement of the roll R carried by the spindle.

A bracket 74 extends between uprights 75 and 76 and a motor 75, having a gear reduction 76 associated therewith, is mounted on this bracket. The motor 75 is effective to impart rotative movement to the gear 77 which meshes with a gear 78 that is mounted on the shaft 79 which passes through the spindle 73. The spindle 73 is detachably connected to the shaft 79 in a suitable manner. Hence, when the motor 75 is set in operation the gear 77 drives the gear 78, which, in turn, rotates the shaft 79 and the spindle 73 in a direction such that the web W is unwound from the roll R.

An arm 80 is pivotally mounted at the upper end of the upright 68, and another arm 81 is similarly mounted on the bracket 74. A roller 82 extends between and is supported by the arms 80 and 81 near the outer free ends of these arms. As the web W is withdrawn from the roll R, it is passed under the roller 82 which rests thereon and serves as a diabolo. Advancing movement of the web W reduces the loop afforded by the aforesaid diabolo wherefore the roller 82 of the diabolo moves upwardly. Shortly after the arm as 81 of the diabolo has passed over the center, the mercury switch 83 mounted thereon is closed. This switch controls operation of the motor 75 so that therefore when the loop formed in the web by the diabolo is reduced in size, rotative movement is imparted to the roll R to unwind the web W therefrom. This results in downward movement of the roller 82 and about the time the arm 81 moves into position thereof

shown in Fig. 3, the mercury switch 83 is opened and thereupon operation of the motor 75 is interrupted and unwinding movement of the roll R ceases.

From the roller 82 the web W passes to the tensioning and perforating unit. This unit is mounted on two rods 83 and 84 that project rearwardly from the rear end of the frame that includes the side frame members 24 and 27. The tensioning and perforating unit includes bosses 85 and 86, Fig. 4, that are provided in the castings 87 and 88 of the unit. The bosses are movable along the rods 83 and 84 into various adjusted positions and when the desired position is attained, set screws as 89 are tightened to thereby retain the bosses 85 and 86 in position.

The castings 87 and 88 include downwardly and rearwardly projecting arms and a rod 90 is extended between these portions near the free ends thereof. The rod 90 affords a support for arms 91 and 92 that are mounted thereon adjacent to the castings 87 and 88. The arms 91 and 92 have pads as 93 at the upper ends thereof and the opposite end portions of a bar 94 are respectively mounted on these pads so that the bar 94 extends between the arms 91 and 92.

Screws 95 and 96 are respectively extended into the upper ends of the castings 87 and 88, and these screws afford a support for a bar 97. Springs as 98 are interposed between the bar 97 and the heads of the screws 95 and 96 and are effective to urge the bar 97 downwardly toward the bar 94. A pad 99 of felt or other suitable material is provided on the bottom face of the bar 97. When the web W is extended through our apparatus, it rests on the upper face of the bar 94 and is frictionally engaged by the pad 99 under the influence of the springs as 98. In order to facilitate initially directing the web between the bar 94 and the plate 99, we mount an eccentric disc as 100 at each end of the bar 97. The eccentrics are equipped with handles as 101 which enable them to be rotated about the screws as 102 by which they are pivotally connected to the bar 97. As best shown in Figs. 1 and 4, the eccentrics respectively rest on the upper ends of the arms 91 and 92, and when the handles 101 are disposed in a horizontal and out-of-the-way position, the bar 97 is freed to the effect of the springs as 98. When, however, the eccentrics as 100 are rotated in a clockwise direction, as viewed in Fig. 1, then, by reason of the eccentricity of the eccentrics, the bar 97 is moved upwardly and the pad 99 is drawn away from the bar 94, and the clearance thus afforded facilitates passing the web between these elements.

A guide 103 of substantially arcuate configuration is connected to the arms 91 and 92 in such a way that the curved face thereof is extended rearwardly. The web W is directed from the roller 82 to the rod 90 and from there passes over the guide 103 and is then extended between the bar 94 and the pad 99. The guide 103 maintains the web W under tension during the time it is passing through our apparatus, and to this end, springs as 104 are effective on the arms 91 and 92 to urge the same in a clockwise direction as viewed in Figs. 1 and 3. Pins as 105 extend through openings in the arms 91 and 92 and include headed portions which are engaged by the arms 91 and 92 to limit movement of the guide 103 under the influence of the springs 104. In the course of passage of the web through our apparatus the arms 91 and 92 and the guide 103 carried thereby may be moved toward the left, as viewed in Figs. 1 and 3, and in order to limit movement of the arms 91 and 92 in this direction, stops as 106 are mounted in a portion of the perforating unit now to be described.

The perforating unit includes a casting 106, Figs. 1, 3 and 4, that extends between the castings 87 and 88. This casting has T-shaped slots 107 and 108 formed therein. Blocks as 109, Figs. 3 and 4, include headed pins as 110 which are mounted for sliding movement in the slots 107 and 108. The blocks as 109 carry the punch of the perforating apparatus, and in the present instance we have provided two blocks as 109 so that perforations as P may be formed in the web W, for example, in the manner illustrated in Fig. 7. It will be understood that in some instances a single block as 109 will be sufficient, while in other instances it will be necessary to provide more than two blocks as 109, as for example, if it was desired to produce three perforations in the web W.

As best shown in Figs. 3 and 3A, each block as 109 has a groove 110 formed in the upper end thereof. An opening 111 extends from the bottom of the groove 110 to the bottom of the block 109, and the punching member of our perforating device is mounted in this opening. Thus a punch holder 112 is mounted in the opening 111 and has an opening 113 extended thereinto from the lower end thereof. The punch member 114 is extended into the opening 113 and is secured therein by set screw 115. In order to prevent the punch holder 112 from rotating in the opening 111, a head 116 is provided which has oppositely disposed flat faces that neatly fit in the groove 110, and this is effective to prevent undesirable rotation of the punch holder 112.

Normally the punch member 114 is held in an upper retracted position by a spring 117 that extends between the lower end of the punch holder 112 and a retaining ring 118 provided at the lower end of the opening 111, the punch member 114 freely extending through a centrally located opening in the retaining ring 118.

The spring 117 is effective to urge the head 116 upwardly into engagement with a peripheral cam as 119 which is fast on a shaft as 120 that is journaled in bushings as 121 in a block as 109. As best shown in Fig. 4, the shaft 120 extends between bosses of the upper ends of the castings 87 and 88 and the blocks as 109 are movable along this shaft into adjusted positions. Cam 119 includes a lobe which, when engaged with the head 116, is effective to force the punch 114 downwardly into punching relation with the die opening 122 and the die plate 123. The die plate 123 is carried by the casting 108 and is secured thereto. Prior to the time the plate 123 is fixed in position the punch means 114 is extended into the die opening 122, and when the plate 123 is tightened under these circumstances, alignment between the punch and die is assured.

The lobe of the cam 119 is moved into position to engage the head 116 by an arm 124, Fig. 8, fast on the shaft 120 outwardly of the casting 88. Reciprocating movement is imparted to the arm 124 from an arm 125 that is fast to the shaft 35 of the platen cylinder 26. An adustable link 127 extends between the arms 124 and 126, and as the arm 126 rotates with the shaft 35, the link 127 is reciprocated to thereby reciprocate the arm 124.

As stated, the web W is directed around the arcuate guide 103 and over the bar 104 so that the pad 99 rests thereon and thereafter the web is directed over the die plate 123. From there the web is extended beneath the shaft 58 and it is then directed over a tensioning roller 128 and then beneath a looper roller 129 and thereafter to a lower feed roller 130 against which it is clamped by rollers as 131.

The tensioning roller 128, Figs. 3 and 9, is mounted between the arms 132 and 133 of a bracket generally indicated by 134 which includes a bearing portion 135 that is pivotally mounted on a shaft 136 which extends between and is carried by side frame members 24 and 27. The bearing portion 135 is freely movable along the shaft 136 to permit adjustment of the position whereat the tensioning roller 128 and a cooperating feeding cam will cooperate with the web. For example, it is desirable to clamp the web between the aforesaid feeding cam and the tensioning roller 128 at a position on the web whereat no impressions are made from printing members as 36, since so to do insures against smearing of an impression made from such printing members. When the desired position of the bearing portion 135 and the roller 128

have been determined, then the bracket 134 is connected to the frame of the machine in such a way that it will be held against shifting movement along the shaft 136.

To this end an arm 137 depends from the bearing portion 135 to have the free end thereof disposed in alignment with a cross member 142 of the stand of the machine including the uprights 75 and 76. A screw 138 extends through a boss portion 139 at the lower end of the arm 137 and is retained in position by a lock nut 140. A stop nut 141 is mounted on the screw 138 in position to engage the adjacent face of the cross member 142. A tensioning spring 143 extends between the cross member 142 and a nut 144 near the end of the screw 138 which is held in position by a lock nut 145. The spring 143 acts on the nut 144 and therefore the screw 138 in such a way as to urge the arm 139 in a clockwise direction, as viewed in Fig. 3, and this urges the roller 128 upwardly beneath the web W.

A web feed cam 146 is mounted on the shaft 23 by having an annular recess 147 formed therein and which embraces the shaft 23. A plate 148 cooperates with the flat face of the feed cam 146 in which the recess 147 is located and includes a portion that also embraces the shaft 23. When the bolts 149 are tightened, the feed cam is tightly clamped to the main drive shaft 23. The transverse position of the cam 146 along the shaft 23 is determined by the positioning of the roller 128 so that the arcuate surface of the cam 146 will be effective to clamp the web between this surface and the roller 128, the effect of the spring 143 assuring that this cam surface and the roller 128 tightly grip the web W so as to effect feeding thereof.

The length of the arcuate surface of the cam 146 is determined by the width of the sheet or business instrument to be severed from the web W so that the surface of cam 146 will cooperate with the roller 128 to feed the web W in an amount equal to the desired width of the sheet or business instrument, the length of such sheet or instrument being determined by the width of the web W. Thus the length of the arcuate surface of the cam 146 will be adjusted to the particular sheet or business instrument to be produced by our apparatus.

Because of intermittent engagement of the cam 146 with the roller 128, the web W is advanced in a step-by-step manner. The web W is maintained under tension and the looper roller 129 is one element that is effective to maintain the web under tension. The looper roller is effective to store a portion of the web that is to be subsequently advanced to the severing mechanism described presently. The looper roller 129 is mounted between ears 150 and 151 on a frame 152 which includes boss portions as 153 and 154 at opposite sides thereof and through which the shaft 136 is extended to thereby support the frame 152 for pivotal movement about the shaft 136.

Looping movement is imparted to the roller 129 under control of cams 155 and 156, Fig. 9, fast on the shaft 35. Arms 157 and 158 on the frame 152 carry rollers 159 and 160 that respectively ride on the peripheries of the cams 155 and 156. The raised peripheral portions of the cams as 155 and 156 are effective on the rollers 159 and 160, and therefore the arms 157 and 158 and roller 129 to move the roller upwardly. When the rollers 159 and 160 move into engagement with the dwell portions of the cams 155 and 156 the frame 152 and the looper roller 129 move downwardly into the position shown in Fig. 3. The positions of the cams 155 and 156 on the shaft 35 are adjusted so that in the course of operation of the apparatus the rollers 159 and 160 are initially engaged with the dwell surfaces of these cams practically immediately after feeding movement is initially imparted to the web W by the cooperation of the cam 146 and the roller 128. Furthermore, the timing is such that the impression roller 25 cooperates with the platen roller 26 to produce impressions from printing members as 36 on the web W during the time feeding movement of the web is being effected by the cam 146 and roller 128. Hence, as the printing operation proceeds and as advancing movement of the web takes place, the looper roller 129 moves downwardly and in this way is effective to form a loop in the web and this movement is also effective to maintain the web W under tension. When the rollers 159 and 160 engage the raised portions of the cams 155 and 156, the loop formed in the web by the roller 129 is reduced in size and, as this reduction takes place, feeding movement is imparted to the web by the shaft 130 and the rollers 131 cooperating therewith.

It is important to limit the amount of upward movement of the frame 152 and looper roller 129 during the feeding operation of the web effected by the rollers 130 and 131, since this insures that only the desired width of the business instrument will be advanced by these rollers. Furthermore, the loop that is formed in the web enables the impressions made by the printing members as 36 on the web W to be uniformly spaced one from the other and in such positions that when business instruments are severed from the web W, the severance will take place intermediate impressions from the printing members on the web and thereby accurate orientation of the impressions with reference to the side marginal edges of the business instruments is brought about.

The shaft 130 is of a uniform diameter throughout its length and is journaled in suitable bearings in side frame members 24 and 27, and one end thereof projects exteriorly of the frame member 27. This portion of the shaft is connected to a one-way clutch and brake arrangement generally indicated by 161, which may be of any suitable construction, as for example, that shown in Patent No. 2,041,183. The one-way clutch and brake arrangement 161 has a gear 162 formed on the outwardly disposed end portion thereof which meshes with the gear segment 163 carried by the rocker 164 that is pivotally mounted on a stub shaft 165 carried by and extended outwardly from the side frame member 27. A reciprocatory movement is imparted to the rocker 164 and during movement thereof in a clockwise direction, as viewed in Fig. 3, the gear 163 thereon is effective on the gear 162 to engage the one-way clutch of the mechanism 161 and thereupon rotative movement is imparted to the shaft 130.

Such reciprocatory movement is imparted to the rocker 164 through a pair of links 167 which are pivotally connected thereto, as indicated at 168. The other ends of the links 167 are connected to a block that is movable relative to the arm 169 which is unitary with the gear 28 on the main drive shaft 23. An adjusting screw 170 is associated with the arm 169 and by manipulation of this screw the connection 171 of the links 167 to the block carried by the arm 169 is adjusted toward or away from the shaft 23 so as to thereby vary this length of the arm of the crank which includes the links 167. This adjustment is effected so that only a predetermined movement is imparted to the gear 162 and shaft 130, and this movement is sufficient to advance the web W a distance equal to the width of the sheet or business instruments to be produced.

As stated, the web is held in engagement with the shaft 130 by rollers as 131. Any desired number of rollers as 131 may be provided at spaced intervals across the apparatus and the number employed will depend upon the width of the web to be fed and kindred factors. In the present instance two rollers as 131 are provided which are spaced one from the other across the machine so as to force portions adjacent to the marginal edges of the web W into engagement with the shaft 130.

The rollers 131 are supported from blocks as 172, Fig. 3, which are mounted on a rail 173 that extends between and which is supported by the side frame members 24 and 27. Each block as 172 includes an overhanging portion as 174 that is adapted to be disposed to

overlie the rail 173. Preferably a groove 176 is afforded in the block 172 into which one marginal portion of the rail 173 may be fitted as shown in Fig. 3. A set screw 177 is extended through a depending lug on the portion 174 and engages the marginal edge of the rail 173 and in this way the block 172 is secured in a predetermined position along the rail 173. Links as 178, Fig. 2, are mounted on each side of a block as 172 and are pivotally connected thereto, as indicated at 179. A spacing pin 180, Fig. 3, extends between the links 178 to maintain the same in predetermined spaced relation. A shaft 181 extends between the links 178 at the lower ends thereof and the roller 131 is afforded by a ballbearing mounted on this shaft between the links 178. Each roller as 131 is urged toward the shaft as 130 under the influence of a spring 182, Fig. 3, mounted in an opening 183 in the block 172. One end of the spring 182 bears on a plunger 184 mounted in the opening 183 and engaged with the cross pin 180. An adjusting screw 185 is fitted into the tapped upper end of the opening 183 and bears against the other end of the spring 182, and by adjusting the position of the screw 185 the tension of the spring 182 may be varied to thereby vary the force with which the roller 131 is urged toward the shaft 130.

In order to facilitate feeding the web over the shaft 130 and under the rollers as 131, an arrangement is provided which enables these elements to be separated. Thus, a pin 186 is extended between the links 178 near the upper ends thereof. This pin is flattened in the portion thereof between the links 178 and when the rollers 131 are to be free to the effect of the spring 182, this flat portion is faced toward the adjacent surface of the block 172. When, however, the handle 187 on the pin 186 is grasped and rotative movement is imparted to the pin 186, the arcuate surface of this pin moves into engagement with the adjacent portion of the block 172, and this is effective to pivot the roller 131 away from the shaft 130.

From the shaft 130 and the rollers 131 the web is lead over a ledge 188 extended between and carried by the side frame members 24 and 27. An angle iron member 189 is also extended between and carried by the side frame members 24 and 27 and the outer face of the flange 190 thereof is faced toward the ledge 188 but terminates in spaced relation therewith so that the web W may be freely fed between these adjacent surfaces. The flange 190 serves as a stripper for the means which is effective to divide the web into individual sheets or business instruments.

This severing means includes a fixed blade 191 that is mounted in the body portion of the ledge 188 and which extends forwardly therefrom and in an upward direction as shown in Fig. 3. A movable knife 192 is mounted in position to have the cutting edge thereof slide past the cutting edge of the knife 191. The web W is directed between these knife edges so that when the knife 192 is lowered into cooperating relation with the stationary knife 191 the web W is severed. The movable knife 192 is carried by a frame 193, at the ends of which arms 194 are provided. The arms 194 are respectively pivotally connected to arms 195 of bell cranks 196. One bell crank 196 is pivotally mounted on the inner face of the frame 24 as indicated at 197 and the bell crank 196 at the opposite side of the machine is similarly mounted on the inner face of the side frame member 27. The arms 198 of the bell cranks 196 have rollers 199 at the free ends thereof which ride on the peripheries of the cams as 200 mounted on the shaft 23 for rotation therewith. A spring 201 extends between a spring anchor 202 on the frame 193 and a spring anchor 204 on the side frame member 24 and this spring is effective to urge the knife 192 toward the stationary knife 191 and it is also effective to maintain the rollers 199 in engagement with the peripheries of the cams 200. It will be understood that a cam similar to the cam 200 is provided adjacent to the side frame member 27 and operates a bell crank lever corresponding to the bell crank lever 196.

The cams 200 are so positioned on the shaft 23 that the rises thereof move into engagement with the rollers 199 at a time immediately subsequent to a feeding operation of the web imparted thereto during operation of the shaft 130 and associated rollers 131. As stated, the amount of advancing movement imparted to the web W by the shaft 130 and the rollers 131 is sufficient to advance the web W a distance equal to the desired width of the sheet or business instrument to be severed from the web. Consequently, when the rollers 199 move onto the rises on the cams 200 the movable knife 192 is lowered into cooperating relation with the stationary knife 191 and the web W is severed along a line thereon inwardly of the free end of the web, such line being spaced inwardly in the amount of the desired width of the sheet or business instrument.

A business instrument or sheet severed from the web W is deposited on suitable conveyor means such as the tapes T to be carried thereby into a printing machine or the like, such as an addressing machine, with which our novel apparatus is associated, the particular manner in which this is effected being described in detail in above referred to Patent No. 2,041,183.

In instances where impressions are not to be made upon the web as it passes through our apparatus, it is possible to resort to a simpler and more compact construction, and an arrangement of this character is shown in Figs. 10 and 11. In Figs. 10 and 11 where an element corresponds to one described hereinabove with reference to Figs. 1 to 9, inclusive, the same reference characters employed in Figs. 1 to 9, inclusive, are used in Figs. 10 and 11 but the letter A is added thereto.

Thus, for example, the arrangement shown in Figs. 10 and 11 includes a stand having legs 75A and 76A which are part of the frame of our apparatus that includes side frame members spaced apart similarly to the side frame members 24 and 27 but which, as can be ascertained by reference to Fig. 10, are much shorter than the side frame members 24 and 27, the side frame member 27A being shown in Fig. 10.

As described hereinabove, the web WA is withdrawn from a roll RA that includes a spindle 73A that rests on rollers 71A and 72A carried by an arm 69A that is pivotally mounted on an upright arm 68A. A lever 70A is connected to the arm 69A to facilitate pivotal movement thereof when a roll as RA is to be mounted on the rollers 71A and 72A, the lever 70A being moved downwardly to dispose the rollers 71A and 72A in a plane lower than the plane in which the spindle 73A is disposed. A diabolo including an arm 80A and a roller 82A is provided and the web WA as it is withdrawn from the roll RA passes under the roller 82A. An arrangement like that described hereinabove and including the motor 75 and associated parts is associated with the roll RA and is effective to impart rotative movement to the roll RA to withdraw the web WA therefrom under the control of a switch similar to the switch 83 and included in the aforesaid diabolo.

In the arrangement shown in Figs. 10 and 11, the web WA passes from the roller 82A directly to a guide 103A which, in this instance, has an end portion 205 that is disposed above the bar 94A which extends between the brackets as 206 that are secured to the frame of the machine, the marginal portion 205 of the guide 103A being connected to the bar 94A. A friction drag is impressed on the web WA as it passes over the marginal portion 205 of the guide 103A and to this end a bar 97A is provided which extends across the apparatus and which has a screw as 95A freely extended to each end portion thereof, the screws being mounted in a portion of the frame of the apparatus. Thus, a spring 98A is interposed between the bar 97A and the head of the screw 95A and is effective to force the layer 99A of felt or other suitable

material secured to the underside of the bar 97A toward the portion of the web WA passing over the marginal portion 205. An eccentric 100A is provided at each end of the bar 97A and when this eccentric is disposed in the position shown in Fig. 10, the material 99A is disposed in frictional engagement with the web. When, however, the handle 101A of the eccentric 100A is turned in a clockwise direction, as viewed in Fig. 10, then the higher part of the eccentric 110 is moved into a lowered position and this is effective to raise the bar 97A and the material 99A so as to facilitate threading of the web WA beneath these elements.

From the marginal portion 205 the web W is directed between a shaft 130A and rollers 131A. The rollers 131A are mounted for movement into different adjusted positions transversely of the apparatus in the manner described hereinabove with reference to the rollers 131 and the parts associated therewith.

A step-by-step movement is imparted to the shaft 130A through a gear 162A fast on the portion of the shaft which extends exteriorly of the side frame member 27A. A gear segment 163A meshes with the gear 162A and is carried by an arm 164A that is pivotally mounted as indicated at 165A. Links as 167A are connected to the arm 164A as indicated at 168A, the other ends of these links being connected to an adjustable block 169A which may be moved into various adjusted positions by the control of the screw 170A. The block 169A is mounted on the main drive shaft 23A which is constantly rotated so long as our apparatus is in operation and which is driven in the manner explained hereinabove with reference to the main drive shaft 23. As in the instance of the shaft 130 and the gear 162, a one-way clutch and brake arrangement is interposed between this gear and shaft. This clutch is engaged during upward movement of the arm 164A which is effective to rotate the gear 162A and the shaft associated therewith in a direction to effect feeding of the web WA. When the arm 164A attains its lowered position then the brake arrangement comes into effect and retains the shaft 130A in the position into which it will have been moved and during movement of the arm 164A the one-way clutch arrangement is disengaged.

As in the instance of the block 169, the block 169A is adjusted relative to the shaft 23A to regulate the amount of movement imparted to the arm 164A and gear segment 163A. This adjustment is such that the shaft driven by the gear 162A will be effective to advance the web WA in an amount equal to the width of the sheet or business instrument to be severed therefrom. The feeding movement so imparted to the web WA advances the same past the movable knife 192A that is carried by the frame members as 193A, the movable knife 192A cooperating with a stationary knife 191A that is mounted in the manner explained hereinabove with reference to the knife 191. The frame member 193A is connected to the arm 195A of a bell crank lever 196A, as indicated at 197A. The other arm 198A of the bell crank lever 196A carries a roller 199A that cooperates with a cam 200A mounted on the shaft 23A. During the time the roller 162A and the shaft driven thereby are at rest, the cam 200A acts on the roller 199A to pivot the bell crank lever 196A about the pivotal mounting 197A thereof, and this is effective to impart lowering movement to the knife 192A which, in cooperation with the knife 191A, severs a sheet from the web WA and deposits the same on feed tapes TA or the like that are effective to carry the sheet away from our apparatus and into association with a printing machine or the like. Since the amount of feeding movement imparted the web W past to the knife 192A is controlled by the amount of rotative movement imparted to the shaft 130A, the knife 192A will be effective to sever a sheet of a predetermined width from the web WA.

It will be manifest from the foregoing description that we have provided an arrangement wherein a web, that is to be severed into sheets of a predetermined width, may be maintained under tension so as to insure uniform movement of the web in the feeding operations thereof. Furthermore, we have provided an arrangement that enables the web to be withdrawn from a roll and passed to and through our apparatus by being directed over a minimum of curved surfaces.

By forming the shafts 130 and 130A so as to be of uniform diameter throughout the length thereof, we insure against distortion of this shaft and this is quite important since distortion of such a shaft would impair accurate feeding of the web.

We have also provided a perforating arrangement that is capable of being disposed in various adjusted positions both longitudinally and transversely of the web so that perforations are produced which are accurately located in the sheets into which the web is divided.

It will also be noted that we have arranged the driving mechanisms of our apparatus in such a way that overhanging elements are avoided. Moreover, we so drive the various elements of our apparatus that no particular element is subjected to distortion that would impair accurate operation of the element.

Consequently, it will be manifest from the foregoing description that we have provided mechanisms which enable the hereinabove set forth and kindred objects of this invention to be realized and while we have illustrated and described the preferred embodiments of our invention, it is to be understood that these are capable of variation and modification, and we therefore do not wish to be limited to the precise details set forth, but desire to avail ourselves of such changes and alterations as fall within the purview of the following claims.

We claim:

1. A web advancing means including a frame embodying spaced apart side members, means adjacent corresponding ends of said side members and affording a resilient arcuate guide surface over which a web withdrawn from a roll of paper, cardbard or the like may be directed, an adjustable friction clamp associated with said arcuate guide surface and effective to apply uniform and unvarying dragging forces to the web as it leaves said arcuate guide surface, means disposed between said side members for imparting an intermittent advancing movement to the web and embodying an annular rotatable member disposed on one side of the web and having the periphery thereof interrupted whereby the peripheral surface of the member affords a web feeding surface of determined length, roller means on the other side of said web that are yieldingly urged toward said annular member to be effective to engage the web with and clamp the web to said feeding surface for a predetermined time, another web advancing means disposed between said side members and spaced forwardly from the first advancing means, oscillating means disposed between said web advancing means and operative to form a loop in the web while holding the same taut, a printing couple spaced rearwardly from the first named web advancing means and forwardly of said friction clamp and effective to make impressions on the web at uniformly spaced intervals therealong, means for concurrently operating the printing couple and the first named advancing means while the second named advancing means remains at rest and for thereafter operating the second named advancing means while the first named advancing means is ineffective, and means for operating the loop forming means in timed relation with the operation of each of said web advancing means.

2. A web advancing means including a frame embodying spaced apart side members, means adjacent corresponding ends of said side members and affording an arcuate guide surface over which a web withdrawn from a roll of paper, cardboard or the like may be directed, means urging said guide surface in a direction opposite to that of the advancing web, means disposed between said side members for imparting an intermittent advanc-

ing movement to the web and embodying an annular rotating member disposed on one side of the web and having the periphery thereof interrupted whereby the peripheral surface of the member affords a web feeding surface of determined length, a roller on the other side of said web that is yieldingly urged toward said annular member to be effective to present the web to said feeding surface and clamp the web thereto in a feeding relation, another web advancing means disposed between said side members and spaced forwardly from the first advancing means, oscillatable means disposed between said web advancing means and operative to intermittently form a loop in the web while holding the web taut, means spaced rearwardly of the first named advancing means and effective to impress a frictional drag on the web, a printing couple disposed between the means impressing the frictional drag and the first named web advancing means and effective to produce impressions on the web at uniformly spaced intervals therealong, means for concurrently operating the printing couple and the first named advancing means while the second named advancing means remains at rest and for thereafter operating the second named advancing means while the first named advancing means is ineffective, and means for operating the loop forming means in timed relation with the operation of each of said web advancing means.

3. A web advancing means including a frame embodying spaced apart side members, a pair of vertically disposed and pivotally mounted arms adjacent corresponding ends of said side members having mounted between them an arcuate guide surface over which a web withdrawn from a roll of paper, cardboard or the like may be directed, means disposed between said side members for imparting an intermittent advancing movement to the web and embodying a rotating roller disposed on one side of the web and having the periphery thereof interrupted whereby the peripheral surface of the rotating roller affords a web feeding surface of determined length, a tensioning roller on the other side of said web that is yieldingly urged toward said rotating roller to be effective to clamp the web against said feeding surface, another web advancing means including a pair of engaged rollers disposed between said side members and spaced forwardly from the first advancing means, means disposed between said web advancing means and operative to form a loop in the web, means for urging said arms and the arcuate guide surface mounted thereon in a direction away from the first named web advancing means to thereby maintain taut the portion of the web intermediate said guide surface and the web advancing means, means disposed between said guide surface and the first named advancing means and effective to impress a constant and unvarying frictional drag on the web, a printing couple disposed between said guide surface and the web advancing means and effective to produce impressions on the web at uniformly spaced intervals therealong, means for concurrently operating the printing couple and the first named advancing means while the second named advancing means remains at rest and for thereafter operating the second named advancing means while the first named advancing means is ineffective, and means for operating the loop forming means in timed relation with the operation of each of said web advancing means.

4. A web advancing means including a frame embodying spaced apart side members, a pair of pivoted arms adjacent corresponding ends of said side members having an arcuate guide surface mounted therebetween and over which a web withdrawn from a roll of paper, cardboard or the like may be directed, means disposed between said side members for imparting an intermittent advancing movement to the web and embodying a rotating roller disposed on one side of the web and having the periphery thereof interrupted whereby the peripheral surface of the roller affords a web feeding surface of determined length, a web tensioning roller on the other side of said web that is yieldingly urged toward said rotating roller, another web advancing means disposed between said side members and spaced forwardly from the first advancing means, oscillating means disposed between said web advancing means and operative to intermittently form a loop in the web while holding the web taut, means for urging said arms and the arcuate guide surface carried thereby in a direction away from the first named web advancing means to thereby maintain taut the portion of the web intermediate said guide surface and the web advancing means, a printing couple disposed between said guide surface and the web advancing means and effective to produce impressions on the web at uniformly spaced intervals therealong, means for concurrently operating the printing couple and the first named advancing means while the second named advancing means remains at rest and for thereafter operating the second named advancing means while the first named advancing means is ineffective, and means for operating the loop forming means in timed relation with the operation of each of said web advancing means.

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