

Oct. 28, 1969

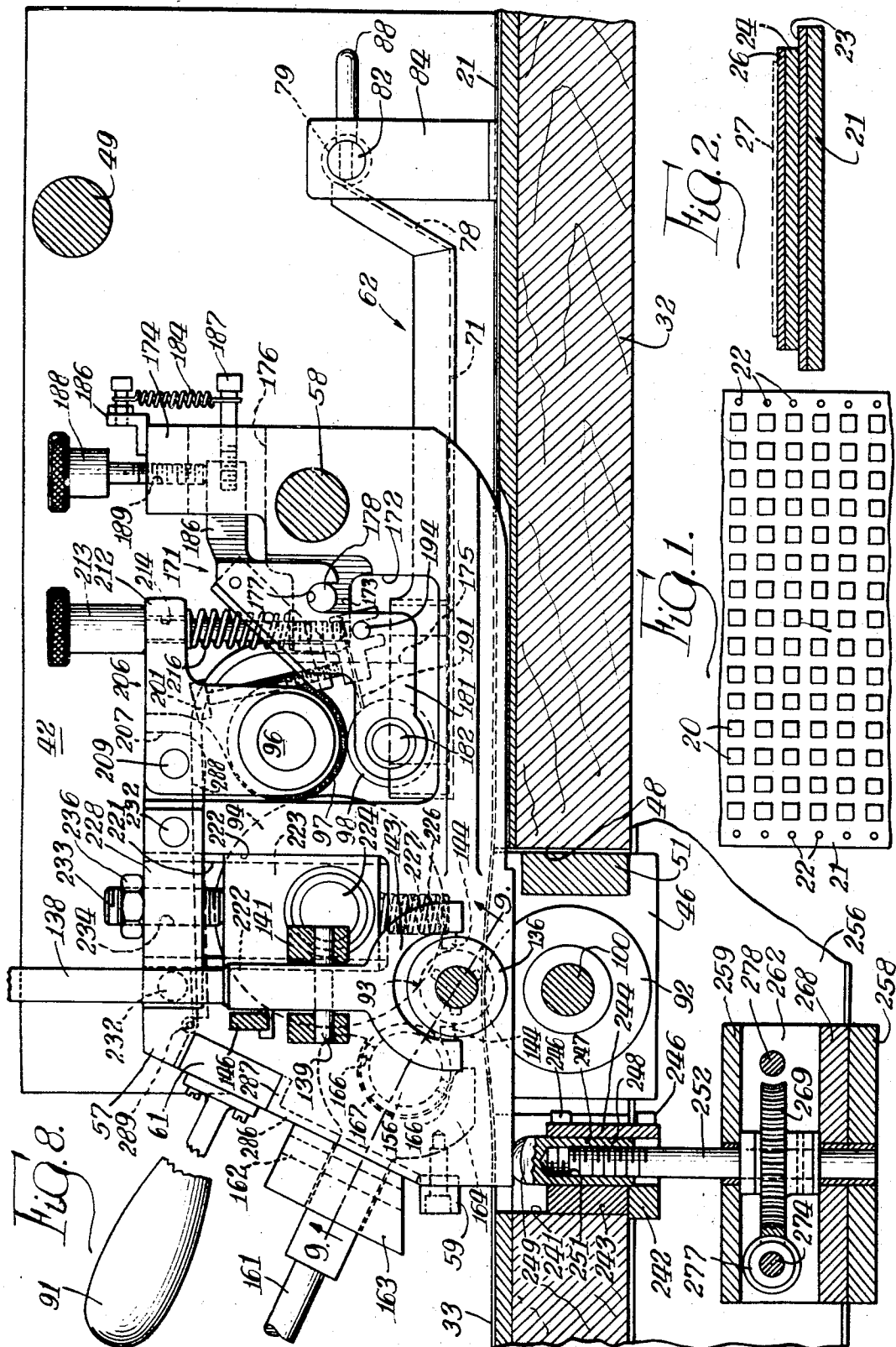
O. W. KAMPF

3,474,727

ROTARY TAX STAMP NUMBERING MACHINE WITH CLUTCH DRIVE

Filed March 7, 1966

5 Sheets-Sheet 1



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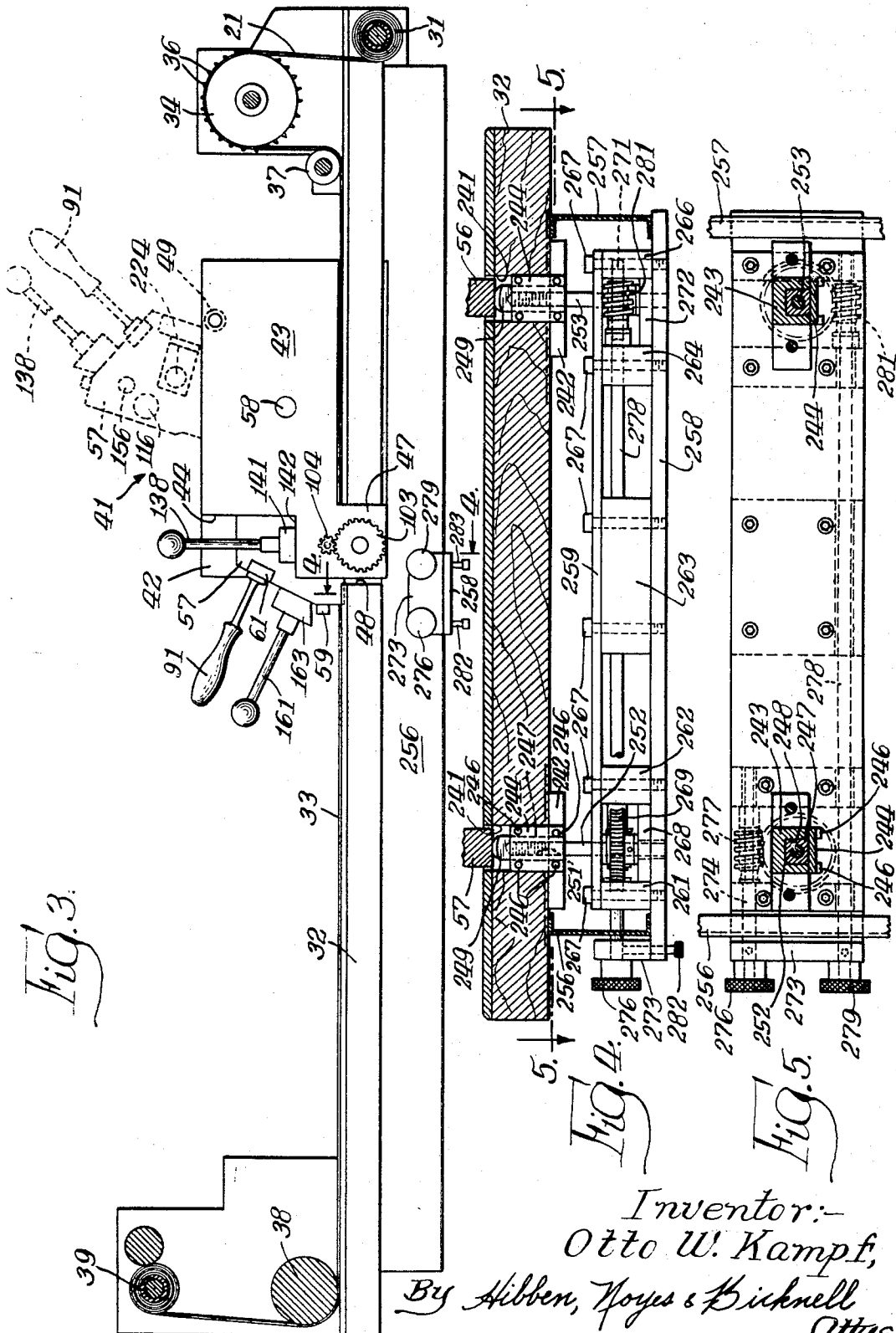
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ROTARY TAX STAMP NUMBERING MACHINE WITH CLUTCH DRIVE

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5 Sheets-Sheet 2



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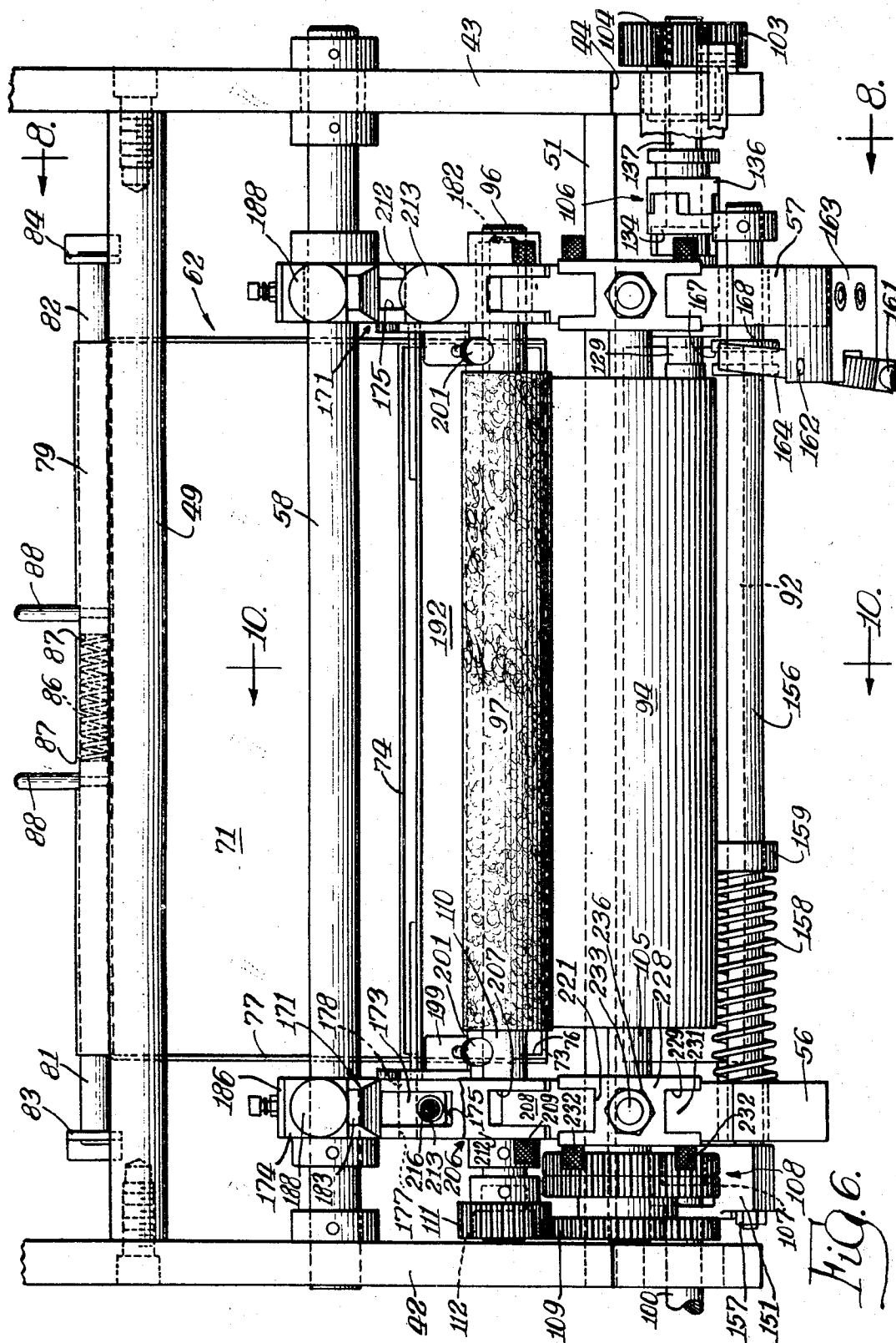
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ROTARY TAX STAMP NUMBERING MACHINE WITH CLUTCH DRIVE

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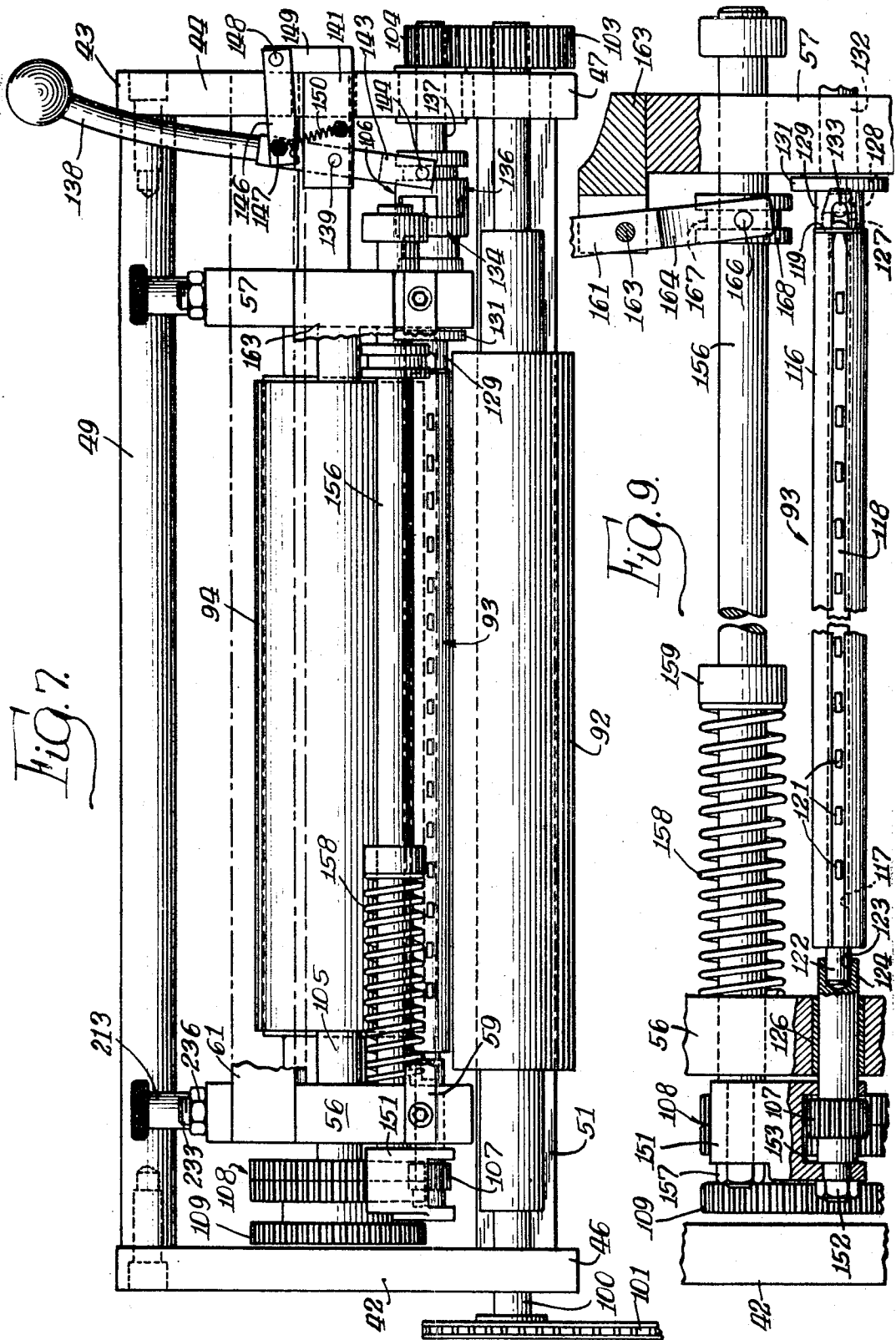
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ROTARY TAX STAMP NUMBERING MACHINE WITH CLUTCH DRIVE

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5 Sheets-Sheet 4



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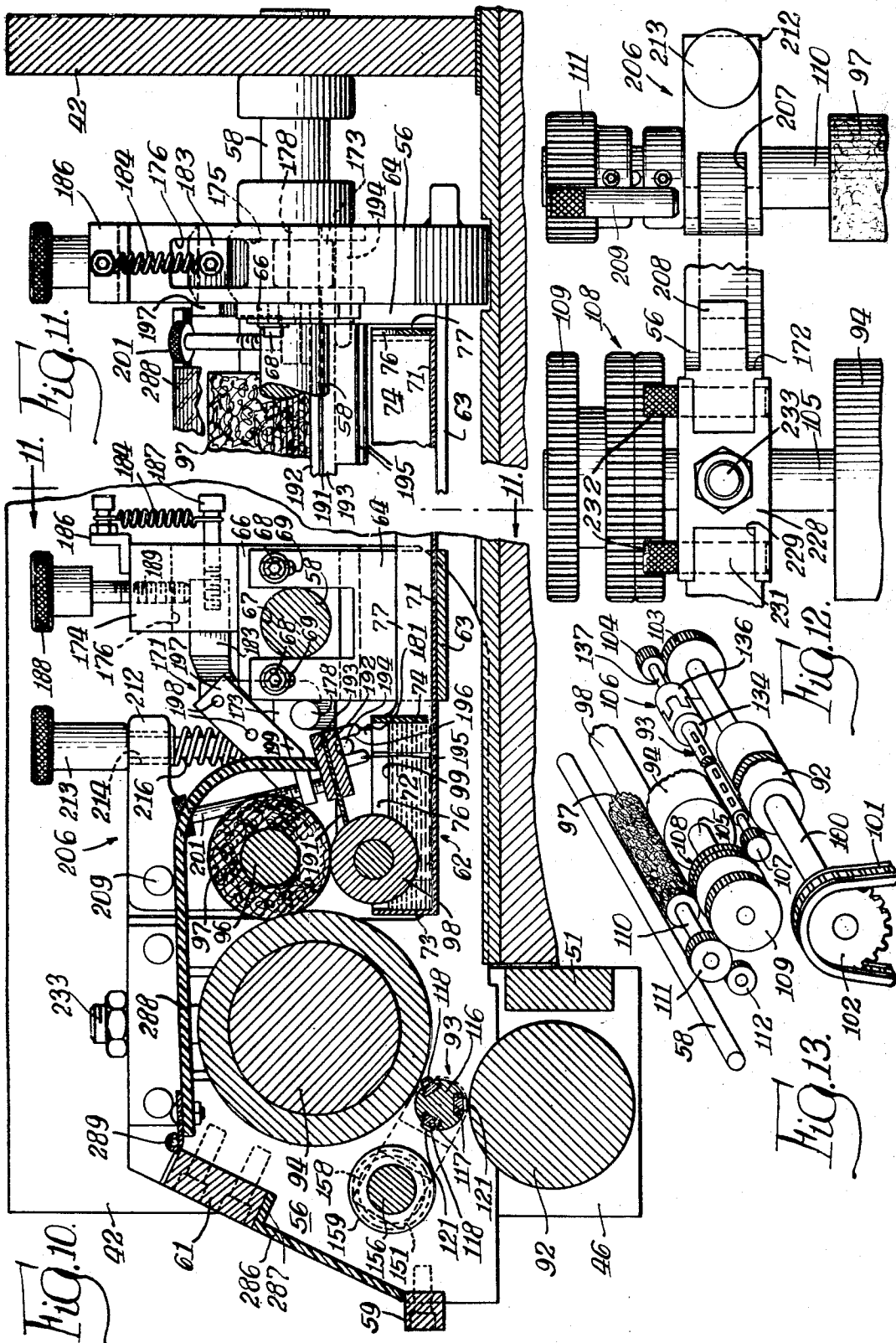
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ROTARY TAX STAMP NUMBERING MACHINE WITH CLUTCH DRIVE

Filed March 7, 1966

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ROTARY TAX STAMP NUMBERING MACHINE WITH CLUTCH DRIVE

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U.S. Cl. 101—219

19 Claims

ABSTRACT OF THE DISCLOSURE

A printing device for printing indicia on a moving web (particularly for printing identification numbers on tax stamps) is mounted on a table across which the web is fed. A plurality of interconnected rollers, including a printing roller for printing on the web, are supported on a frame structure which is pivotally mounted on the table for manual movement between a generally horizontal printing position adjacent the web and an elevated non-printing position substantially away from the web. Drive means is provided for rotating the roller system when the frame is in printing position, and a manual clutch is provided for disconnecting the drive means from the roller system to permit pivoting of the frame to non-printing position. The printing roller is removably mounted on the frame to permit replacement of printing elements. Pressure regulating means are provided between the various rollers of the system.

This invention relates broadly to improvements in a machine for printing indicia on a moving web. More particularly, the invention relates to a novel and improved machine of the aforementioned character which is particularly adapted for printing identification data on a pre-printed web having many small imprints, such as revenue stamps or the like.

Although the invention will find many varied uses in connection with the printing of a moving web, the invention has particular utility in connection with revenue or tax stamps used on cigarette packages or the like as required by various municipal and state regulations. Accordingly, the subsequent description of the invention relates to the latter embodiment, but it should be understood that the invention is not limited to this particular field of use.

In accordance with the customary procedure in the trade, cigarettes are distributed to retail outlets by various tobacco distributors or wholesalers. In compliance with the regulations of the particular state or municipal governing body, the tobacco distributor or wholesaler is authorized to apply a tax stamp to each cigarette package before delivery to the retailer. However, for various reasons, the governmental bodies and law enforcement agencies desire to have some form of code marking or identification on each tax stamp which will indicate the particular authorized distributor or wholesaler who applied the tax stamp. Such code marking or identification is of great value in combating counterfeiting of tax stamps and is also of assistance in tracking down stolen goods.

Although various code marking systems have been tried in the past, it has been found that one of the most effective systems is to have a suitable code marking imprinted on the tax stamps by each distributor or wholesaler after the stamps have been received from the state or municipal revenue authorities. For maximum effectiveness of the system, it is desirable that the code marking be normally concealed from view after the tax stamp has been applied to the cigarette package but the marking should be capable of being exposed when desired in order to check the authenticity of the stamp or other suspected irregularity in the use of the stamp. Furthermore, the machine for print-

ing the code marking must be capable of high-speed operation so that the distributor or wholesaler can apply the code markings to the stamps quickly and with minimum inconvenience and delay. In addition, the design of the machine must be such that changes in the code marking can be made in a simple and rapid manner.

Accordingly, the broad object of the invention is to provide a novel and improved printing device for printing indicia on a moving web.

A more specific object of the invention is to provide a novel and improved printing device for printing identification data or code markings on a web of preprinted elements such as revenue stamps or the like.

A further object of the invention is to provide a high-speed machine of the foregoing type which is inexpensive and simple to use so that it is feasible for each distributor or applier of tax stamps to print the required code marking on the preprinted stamps before the stamps are applied to cigarette packages or other articles.

Another object of the invention is to provide a machine of the foregoing type which is especially adapted for use with revenue or tax stamps of the heat-applied type.

An additional object of the invention is to provide a machine of the foregoing character which is adapted to print code markings on tax stamps in a manner such that the code markings are normally concealed from view after the stamps have been applied to cigarette packages or other articles.

Still another object of the invention is to provide a machine of the foregoing character in which changes in the desired code marking can be made in a rapid and simple manner.

Other objects and advantages of the invention will become apparent from the subsequent detailed description taken in conjunction with the accompanying drawings, wherein:

FIG. 1 is a fragmentary plan view of a portion of a web having a plurality of cigarette tax stamps thereon;

FIG. 2 is a schematic cross-sectional view, on an exaggerated scale, of a single tax stamp;

FIG. 3 is a side elevational view of a machine for printing code markings on tax stamps and comprising one specific embodiment of the invention;

FIG. 4 is a fragmentary transverse cross-sectional view taken substantially along the line 4—4 of FIG. 3;

FIG. 5 is a fragmentary sectional view taken substantially along the line 5—5 of FIG. 4;

FIG. 6 is a fragmentary top plain view, on an enlarged scale, of the printing section of the machine shown in FIG. 3 with portions of the structure broken away for clarity;

FIG. 7 is a front elevational view of the section of the machine shown in FIG. 6 with portions of the structure broken away for clarity;

FIG. 8 is a sectional view taken along the line 8—8 of FIG. 6;

FIG. 9 is an enlarged fragmentary sectional view taken along the line 9—9 of FIG. 8;

FIG. 10 is a fragmentary sectional view taken along the line 10—10 of FIG. 6;

FIG. 11 is a fragmentary rear elevational view as seen along the line 11—11 of FIG. 10;

FIG. 12 is an exploded plan view of a portion of the structure shown in FIG. 10 and illustrating a detachable feature of the construction; and

FIG. 13 is a schematic perspective view showing a portion of the drive system of the machine.

Although tax stamps in the form of water or solvent applied transfers, labels, or stickers have been used heretofore, it is well-known that a heat-applied transfer offers many advantages, particularly where many thousands of individual cigarette packages must have tax stamps ap-

plied thereto in a relatively short period of time. In a heat-applied transfer, the transfer is carried on a temporary paper backing with a heat softenable coating of wax or the like interposed between the paper and the transfer design. The outermost exposed layer of the transfer design is covered with a heat-activatable or thermoplastic adhesive material. Consequently, when the adhesive coated side of the stamp is placed in contact with the cellophane wrapper of a cigarette package, the stamp is permanently affixed to the wrapper merely by applying heat and pressure to the outer side of the paper carrier, thereby simultaneously softening the wax coating and releasing the stamp from the carrier and also activating the thermoplastic adhesive so that the released stamp is adhered to the package. Various machines are known for use in conjunction with heat applied transfers, e.g. see U.S. Patents Nos. 2,493,522, Re. 24,516, and 3,001,310.

For a complete understanding of the invention, a typical heat-applied tax stamp construction is illustrated in FIGS. 1 and 2. As seen in FIG. 1, the tax stamps, indicated at 20, are printed in transverse rows extending across an elongated paper web 21 having uniformly spaced perforations 22 along its opposite longitudinal edges. FIG. 1 is merely a fragmentary section of such a web 21, it being understood that the web is supplied to the tobacco distributor or wholesaler in the form of a roll containing, for example, 30,000 tax stamps or any desired number of the same. FIG. 2 is a schematic cross-sectional view of a single stamp 20 as carried on the web 21, the scale being exaggerated for clarity. As seen in FIG. 2, the paper web 21 is provided with a heat release wax coating 23 on one side. The tax stamp itself consists of an intricate design which is difficult to counterfeit and is prepared by printing on the wax coating 23 a plurality of different colored lacquer layers to make up a composite design designated at 24. As an outermost layer, a heat activatable or thermoplastic adhesive material 26 is printed over the design 24. In applying the tax stamp to a cigarette package, a heated platen is pressed against the uncoated or outermost side of the paper web 21 and causes the thermoplastic adhesive layer 26 to engage the cellophane wrapper on the cigarette package. The heat of the platen simultaneously softens the wax layer 23 and activates the thermoplastic adhesive layer 26 with the result that the layers 24 and 26 are released from the web 21 and adhere as a unit to the cigarette package.

In accordance with the present invention, the code marking or printing machine is utilized to apply an identification number or other code marking over the thermoplastic adhesive layer 26, as indicated in dotted lines at 27. The code number 27 serves to identify the particular distributor or wholesaler who has applied the stamps to the cigarette packages. All stamps applied by a given distributor may bear the same number or code marking, although the marking may be subject to change from time to time for maximum security.

When the tax stamp has been applied to the cellophane outer wrapper of a cigarette package, as described above, it will be understood that the design layer 24 is outermost. Consequently, when the package is viewed in the normal manner, the code marking or identification number 27 will be concealed from view since it is sandwiched in between the thermoplastic adhesive layer 26 and the cellophane wrapper. However, upon removal of the cellophane wrapper from the cigarette package, the identification number 27 can readily be seen through the transparent cellophane by viewing the latter from the inside of the wrapper. Thus, although the code marking is normally concealed from view, it is a simple matter to remove the cellophane wrapper whenever it is desired to check the presence or authenticity of the code marking.

In FIG. 3, a complete printing machine comprising one specific embodiment of the invention is shown, including the web feeding arrangement. As shown in FIG. 3, a supply roll of tax stamps 31 is rotatably supported at one

end of an elongated table 32, and the web, designated at 33, extends upwardly and thence downwardly over a large diameter drum 34 having a plurality of radially projecting pins or pegs 36 at each end thereof which are adapted to extend through the edge apertures in the web 33. Thus, the web 33 is at all times in positive engagement with the pegs 36 of the rotating drum 34 so that the speed of the web is accurately controlled and coordinated with the operation of the remaining portions of the machine.

From the drum 34, the web 33 extends horizontally beneath a guide roller 37 and is supported on the upper surface of the table 32 during horizontal movement therealong. At the opposite end of the table 32 the web 33 passes upwardly around a guide roller 38 and is then rewound on a rewind roll 39. Intermediate the opposite ends of the table 32 the printing mechanism 41 is located for printing the code numbers or other markings on the outermost exposed sides of the tax stamps, as heretofore described.

Referring particularly to FIGS. 3 and 6 to 9, the printing mechanism 41 includes a pair of upright plate-like standards or supports 42 and 43 affixed to the opposite side edges of the table 32. The upper forward corner portion of the standard 43 is cut away to provide a corner recess 44 (FIG. 3), and both of the standards 42 and 43 are provided with depending portions 46 (FIG. 8) and 47 (FIG. 3), respectively, which project downwardly into a transversely extending gap or opening 48 in the table 32. The upper rearward portions of the standards 42 and 43 are rigidly interconnected by a transversely extending tie rod 49, and the depending portions 46 and 47 of the standards are rigidly interconnected by means of a transversely extending tie bar 51 (FIGS. 6, 7, and 8) disposed in the gap 48 below the uppermost surface of the table 32.

The printing mechanism 41 further comprises a roller system (hereinafter described) mounted between a pair of upright side plates 56 and 57 disposed inwardly of the standards 42 and 43, respectively, and swingably connected adjacent their rear edges to a transverse pivot shaft 58 extending between the central portions of the standards 42 and 43. The side plates 56 and 57 are rigidly interconnected at their forward edges by a lower front tie bar 59 and an upper front tie bar 61. The swingable mounting of the side plates and roller system therebetween facilitates changing of the stamp rolls, threading of the web in the machine, and adjustment or servicing of various parts of the roller system.

A rectangular ink pan, designated generally at 62 (FIGS. 6, 8 and 10), is disposed in spaced relation above the surface of the table 32 and extends underneath the pivot shaft 58 between the side plates 56 and 57. The ink pan 62 is removably supported by means of a generally U-shaped cradle having a transverse bottom 63 (FIGS. 10 and 11) and upstanding legs at its opposite ends, one of such legs being shown at 64 in FIGS. 10 and 11. The cradle legs 64 are suspended from the pivot shaft 58 by means of a pair of cradle support blocks 66 adjustably secured to the legs 64 and having the pivot shaft 58 extending therethrough. One such support block 66 is shown in FIGS. 10 and 11, the block 66 having an aperture 67 through which the pivot shaft 58 extends and being adjustably connected to the cradle leg 64 by means of a pair of screws 68 extending through elongated slots 69 in the leg 64 and received in threaded openings in the block 66.

As will be clear from FIGS. 10 and 11, the bottom wall portion, designated at 71, of the ink pan 62 rests on the bottom portion 63 of the cradle support, and the ink pan has an ink chamber or receptacle 72 disposed forwardly of the cradle 63-64 and defined by a forward wall portion 73 and a rearwardly spaced transverse partition 74 extending between the side walls, designated at 76, of the ink pan. Rearwardly of the partition 74 the side walls 76 of the ink pan have a decreased vertical height, as at 77,

and the bottom wall portion 71 of the ink pan has an upwardly inclined rear end portion 78 (FIG. 8), the terminal edge of which is curled to form a rear tubular portion 79. As seen in FIG. 6, a pair of slide rods 81 and 82 are slidably supported in the tubular portion 79 and have projecting outer end portions which are removably received in a pair of apertured upright brackets 83 and 84 affixed to the upper surface of the table 32 and spaced far enough apart to permit movement of the web 33 therebetween. A compression spring 86 is disposed within the tubular portion 79 and engages the innermost ends of the slide rods 81 and 82 for urging the latter outwardly into engaged relation with the brackets 83 and 84. The wall of tubular portion 79 is provided with a pair of slots 87 for receiving a pair of stop pins 88 rigidly affixed adjacent the innermost ends of the slide rods 81 and 82 and projecting rearwardly through the slots 87.

As will be evident from FIG. 6, when the slide rods 81 and 82 are in their normally projected position in engagement with the brackets 83 and 84, the stop pins 88 abut the outermost ends of the slots 87. However, by grasping the pins 88 and urging them toward each other, i.e. towards the opposite ends of the slots 87, the spring 86 is further compressed and the slide rods 81 and 82 can be withdrawn from the brackets 83 and 84 to permit rearward removal of the ink pan 62 from the cradle support 63-64.

As will be understood from FIG. 10, the elevation of the forward portion of the ink pan 62 can be adjusted by means of the screw and slot connections 68-69 so that the pan is pivoted upwardly or downwardly about the axis of the tubular portion 79, thereby leveling the ink supply in the ink receptacle 72 and also regulating, to some degree, the extent of immersion of an ink pickup roller in the ink supply, as hereinafter described.

As previously mentioned, the roller system for effecting the desired code marking on the web 33 is carried between the swingably mounted side plates 56 and 57. Consequently, when the side plates 56 and 57 and the rollers carried therebetween are in their lowermost generally horizontal position as seen, for example, in FIGS. 3, 8, and 10, the machine is in operative relation for printing code markings on the web 33. However, when the interconnected side plates and the rollers carried therebetween are pivoted upwardly about the pivot shaft 58, as by a handle 91 affixed to the tie bar 61, to the elevated or generally upright position shown in broken lines in FIG. 3, the machine is then in non-printing position for the purposes of adjusting or replacing the tax stamp supply roll or other portions of the device, as hereinafter described. As seen in FIG. 3, upward and rearward pivotal movement of the side plates is limited by abutment of the side plates 56 and 57 against the transverse tie rod 49 which extends between the fixed upright standards 42 and 43. The rear shallow portion of the ink pan 62 which extends beneath the pivot shaft 58 and the tie rod 49 serves as a drip catcher when the side plates 56-57 are in upwardly pivoted position.

For a general understanding of the roller system, reference is first made to FIGS. 8, 10 and 13. A smooth surfaced metal impression or backup roller 92 is journaled on a fixed axis between the depending portions 46 and 47 of the standards 42 and 43, the periphery of the impression roller 92 extending slightly above the top surface of the table 32 for engaging the underside of the web 33, as best seen in FIG. 8. A removable printing or numbering roller 93 is detachably mounted between the side plates 56 and 57, as described below, and is fitted with replaceable printing or type elements (hereinafter described) for contacting the upper side of the web 33 opposite the impression roller 92. An inking roller 94 is also removably mounted between the side plates 56 and 57 and engages the printing roller 93 to transfer to the latter. A metering roller 96 having an outermost covering 97 of felt or the like and an ink pickup roller 98

are also removably mounted between the side plates 56 and 57 rearwardly of the inking roller 94. The periphery of the pickup roller 98 extends downwardly into the ink chamber 72 of the ink pen 62 and is immersed below the surface, designated at 99 in FIG. 10, of the link supply contained therein. Thus, during operation of the device, the web 33 moves forwardly between the impression roller 92 and the numbering roller 93, and it is picked up from the ink chamber 72 by the immersed pickup roller 98 and is transferred successively to the metering roller 96-97, to the inking roller 94, and to the numbering roller 93.

When the device is in its forwardly pivoted printing position, the entire roll assembly is driven by means of a chain drive 101 (FIGS. 7 and 13) which engages a sprocket 102 at one end of a shaft 100 on the impression roller 92. The opposite end of the impression roller shaft 100 carries a gear 103 which is meshed with a smaller gear 104 for driving the numbering roller 93 through a clutch 106 (described in more detail below). At the opposite end of the numbering roller 93 a gear 107 is provided which is meshed with a double spur gear 108 mounted on a shaft 105 for the inking roller 94. Another spur gear 109 mounted on the shaft 105 in spaced relation from the gear 108 is meshed with a gear 111 carried on a shaft extension 110 for the metering roller 96-97, and the gear 111 is, in turn, meshed with a gear 112 carried on the shaft for the ink pickup roller 98. Although not shown in the drawings, the chain drive 101 is connected to a main power source which also provides the power for driving the web unwinding or feed drum 34 and also the rewind roller 39 so that the entire printing machine is operated in coordinated and timed relation.

As previously explained, for maximum effectiveness of a code marking system for revenue stamps or the like, it is necessary that the same number or other marking be printed on all of the stamps on the web in a given printing operation. Furthermore, it must be possible to change the number whenever desired in a quick and simple manner. Accordingly, a primary feature of the present invention resides in the construction, the mounting, and the driving arrangement for the numbering roller 93.

Referring to FIGS. 7, 9 and 10, the numbering roller 93 has a cylindrical body portion 116 with a plurality of elongated grooves 117 of generally T-shaped cross-section extending substantially the full length of the body portion 116. In this instance, three grooves 117 are provided and are spaced equally around the circumference of the body portion 116. Each groove 117 receives an elongated numbering strip 118 having a snug frictional fit in the groove 117 but being readily removable therefrom. When the roller 93 is detached from the machine, as hereinafter described, the numbering strips 118 can be inserted into or withdrawn from the grooves 117 at the axially open ends thereof, i.e., at the left-hand end of the roller body portion 116 as viewed in FIG. 9. When the strips 118 are fully inserted in the grooves 117, the innermost ends of the strips abut a retaining washer 119 which is rigidly affixed at the right-hand end of the roller body portion 116, as viewed in FIG. 9, so as to form a closure for the opposite ends of the grooves 117. Thus, when the strips 118 are pressed into the grooves 117 until they abut the retaining washer 119, they are automatically positioned in proper printing relation with respect to the web 33.

The numbering strips 118 are provided with suitable type elements or the like, as indicated schematically at 121, for printing on the web 33. The type elements 121 are spaced uniformly along the length of the numbering strips 118 to conform to the spacing of the tax stamps in a single transverse row extending across the web 33. Thus, in this instance, each row across the web 33 comprises fifteen tax stamps (as at 20 in FIG. 1), and each numbering strip 118 comprises fifteen similarly spaced type elements 121. Conveniently, the strips 118 may comprise

a metal base received in the wide portion of the T-shaped groove 117 and a somewhat narrower rubber strip bearing the type elements 121 and bonded to the underlying metal base. As seen in FIG. 10, the narrow type elements 121 of the strips 118 project outwardly through the narrow portions of the T-shaped grooves 117 beyond the periphery of the roller body portion 116 for engaging the web 33.

As viewed in FIG. 9, the left-hand end of the numbering roller body portion 116 is provided with a reduced diameter end shaft portion 122 having an axially detachable keyed connection in an end socket portion 123 of a stub shaft 124. The stub shaft 124 is axially slidable in a bushing 126 mounted in an aperture in the side plate 56. The right-hand end of the numbering roller 93, as viewed in FIG. 9, is provided with a reduced diameter end shaft portion 127 having a tapered extremity which is received within a complementally shaped socket portion 128 of a stub shaft 129. The stub shaft 129 also has an enlarged flange 131 which bears against the inner face of the side plate 57 and a shaft extension 132 which is journaled in the side plate 57. The numbering roller 93 has a detachable driving connection with the stub shaft 129 by means of a transverse pin 133 extending through the end shaft portion 127 and fitted in a groove within the stub shaft 129.

The clutch 106 (FIG. 13) has a driven clutch half 134 (FIGS. 6 and 7) which is affixed to the outermost end of the stub shaft extension 132 at the outer face of the side plate 57. A driving clutch half 136 engageable with the driven clutch half 134 is mounted on the end of a clutch shaft 137 extending through an aperture in the upright standard 43 for axial shifting movement therein. The opposite end of the clutch shaft 137 carries the gear 104 which meshes with and is driven by the gear 103 at the outer face of the standard 43.

A manually operated clutch lever 138 (FIGS. 3, 7 and 8) is pivotally supported by a cross pin 139 extending through the lever 138 into a bifurcated support block 141, the latter being affixed to a horizontal shoulder 142 (FIG. 3) formed by the cut-out 44 in the standard 43. The lower end of the lever 138 below the support 141 has a yoke portion 143 which fits around and is connected to the driving clutch half 136 by means of a pair of inwardly projecting pins 144 which extend into an annular groove 145 in the clutch half 136. A link 146 (FIG. 7) is pivotally connected at 147 to the lever 138 and at 148 to a post 149 at the outer end of the block 141, and a tension spring 150 coacts between the pivot 147 and the block 141 in overcenter relation with respect to the lever pivot 139. As seen in FIG. 7, the clutch lever 138 is in clutch-engaging position and is held in such position by the spring 150. However, by manually pressing the upper end of the lever 138 inwardly, i.e., to the left in FIG. 7, the driving clutch half 136 can be disengaged from the driven clutch half 134 by reason of the axially shiftable mounting of the clutch shaft 137 in the standard 43. In the disengaged position, the pivot 147 is shifted to the opposite side of the pivot axis 139 and the spring 150 holds the clutch lever in such position. It will be understood that the width or thickness of the gears 103 and 104 is such that during the limited axial shifting of the clutch shaft 137 for engaging and disengaging the clutch halves 134 and 136, the gear 104 always remains in mesh with the gear 103.

As seen in FIGS. 7 and 9, the axially shiftable stub shaft 124 extends through the side plate 56 and through a bifurcated lower end portion of a gear housing 151 disposed adjacent the outer face of the side plate 56. The gear housing 151 is rigidly connected to the stub shaft 124 by means of a threaded projection and a nut 152. The gear 107 which provides the driving connection between the numbering roller 93 and the inking roller 94 is affixed to the stub shaft 124 within a lateral recess 153 at the bifurcated lower end of the gear housing 151.

In order to effect shifting movement of the stub shaft 124 to permit removal of the numbering roller 93, a spring-loaded shaft 156 is mounted for limited axial shifting movement in the side plates 56 and 57. As viewed in FIG. 9, the left-hand end of the shaft 156 projects beyond the side plate 56 through the gear housing 151 and is rigidly affixed to the latter, as by nut 157 engaging a threaded extremity of the shaft 156. As will be understood particularly from FIGS. 8 and 10, when the side plates 56 and 57 and the roller assembly carried therebetween are in their forwardly pivoted printing position, the shaft 156 is disposed forwardly and slightly above the printing roller 93, and the gear housing 151 extends angularly therebetween. A compression spring 158 encircles the shaft 156 with its ends engaging the side plate 56 and a stop collar 159 affixed to the shaft 156 for normally urging the shaft 156 to the right, as viewed in FIG. 9, and thereby normally urging the gear housing 151 and the stub shaft 124 to the right so that the stub shaft 124 engages the end shaft portion 122 of the numbering roller 39. For disengaging the stub shaft 124 from the numbering roller 93, a hand lever 161 (FIGS. 3, 6, 8, and 9) has a pivotal connection 162 in a bifurcated guide block 163 affixed to the side plate 57 and extending inwardly therefrom adjacent the tie bar 59. The lower end of the hand lever 161 is provided with a yoke portion 164 which embraces the spring loaded shaft 156 and is operatively connected thereto by means of a pair of inwardly projecting pins 166 which extend into a groove 167 in a collar 168 rigidly mounted on the shaft 156.

When it is desired to pivot the interconnected side plates 56 and 57 to the generally upright broken line position shown in FIG. 3, the operator first stops the drive mechanism of the machine and then pushes the upper end of the hand lever 138 inwardly so as to shift the clutch shaft 137 and the attached driving clutch half 136 to the right, as viewed in FIG. 7, thereby disengaging the clutch halves 134 and 136. When the hand lever 138 has been thus manipulated, the spring 150 holds the clutch 134-136 in disengaged position by reason of the overcenter relation of the spring and the pivot 139. The side plates 56 and 57 and the roller assembly mounted therebetween can now be lifted upwardly by means of the handle 91, thereby pivoting the entire framework about the pivot shaft 58 until the side plates engage the tie rod 49, as in FIG. 3. In this position, the numbering roller 93 is exposed and readily accessible. The upper end of the hand lever 161 is now moved toward the side plate 57, thereby urging the spring-loaded shaft 156 to the left, as viewed in FIG. 9, against the action of the spring 158. Movement of the shaft 156 to the left also carries with it the gear housing 151 and the stub shaft 124 which shifts axially in its bushing 126, thereby disengaging the socket portion 123 of the stub shaft 124 from the end shaft portion 122 of the numbering roller 93. By a slight cocking movement of the numbering roller 93, the right-hand end shaft portion 127 can now be disengaged from the socket 128 of the stub shaft 129 and the numbering roller 93 thereby completely detached from the machine. Upon release of the hand lever 161, the spring loaded shaft 156 is restored to its FIG. 9 position. The operator can then service the numbering roller 93, e.g. by installing new numbering strips 118, and the foregoing operations are repeated in reverse sequence in order to restore the machine to operating condition.

In order to insure and maintain proper register of the type elements 121 with the tax stamps on the web during a printing operation, it will be understood that the spacing of the pegs 36, the spacing of the numbering strips 118, and the rotary speeds of the numbering roller 93 and the web feed and rewind mechanism must all be coordinated with the spacing between the rows of stamps on the web. Moreover, during operation of the clutch lever 138 and the hand lever 161, the relationship must not be disturbed. Thus, as previously mentioned, the gears 104 and

103 remain in meshed relation at all times during manipulation of the clutch lever 138. Likewise, the gear 107 remains in meshed relation with the double spur gear 108 at all times during shifting movement of the stub shaft 124 upon manipulation of the hand lever 161.

In addition to the easy removability of the numbering roller 93, the invention also makes special provision for easy removability and pressure adjustment in connection with the pickup roller 98, the metering roller 96-97 and the inking roller 94. Thus, when the device is in its forwardly pivoted printing position, the desired pressure adjustments of the rollers can be made as required for most efficient operation. In addition, when the device is not being used, the other rollers may readily be removed from the machine for maintenance or replacement. As hereinafter described, the removability of the metering roller 96-97 is especially important.

The pickup roller 98 is preferably a metal roller and may be provided with a plurality of circumferentially extending grooves (not shown) spaced axially along the length of the roller in order to effect controlled pickup of ink as the roller 98 rotates while immersed in the ink supply in the receptacle 72.

The pickup roller 98 is adjustably supported by means of a pair of rocker arms designated generally at 171 (FIGS. 6, 8, 10, and 11) which are disposed in enlarged recesses or cutouts 172 (FIG. 8) which are provided in the side plates 56 and 57. At the rear edge of the recess 172, each side plate has a forwardly extending integral projection 173, and the rearwardmost portion of the side plate above the pivot shaft 58 provides an upstanding post portion 174 with a rectangular aperture 176 therethrough. Each rocker arm 171 has an elongated central slot 175 (FIGS. 6 and 11) which receives the projection 173 of the side plate, and the portions of the rocker arm 171 on opposite sides of the central slot 175 are formed to provide arcuate recesses 177 (FIG. 8) adapted to fit over and receive the projecting ends of a pivot pin 178 extending rigidly at opposite sides of the projection 173. Thus, each rocker arm 171 is detachably and pivotally supported on the pin 178 of the corresponding side plate 56 or 57. The lower end of each rocker arm 171 has a forwardly extending portion 181 (FIG. 8), and the pickup roller 98 is journaled between the rocker arm portions 181 by means of end shaft portions 182 extending from the roller 98. Although not seen in FIG. 8, it will be understood that the gear 112 (FIG. 13) is secured to the end shaft portion of the pickup roller 98 at the opposite end from that seen in FIG. 8.

The upper end portion of each rocker arm 171 is provided with a rearward extension 183 (FIG. 8) which projects into the aperture 176 in the post portion 174 of the corresponding side plate. A tension spring 184 is fastened at its upper end to a bracket 186 on the top of the post portion 174 and at its lower end to a screw 187 which is threaded into the outer end of the extension 183 and projects rearwardly from the post portion 174 through the aperture 176. An adjustment screw 188 extends downwardly through a threaded opening 189 in the post portion 174 and projects into the aperture 176 to provide an abutment for the extension 183 of the rocker arm 171. As viewed in FIG. 8, it will be understood that the spring 184 tends to rock the arm 171 in a counterclockwise direction about the pivot pin 178 so as to move the pickup roller 98 away from the metering roller 96-97, whereas inward adjustment of the screw 188 causes rocking of the arm 171 in a clockwise direction against the action of the spring 184 to urge the pickup roller 98 toward the metering roller 96-97. Thus, adjustment of the screw 188 permits regulation of the pressure between the pickup roller 98 and the metering roller 96-97.

As previously mentioned, the pickup roller 98 may be provided with spaced circumferential grooves of predetermined depth and spacing in order to regulate the quantity of ink picked up by the roller. For additional con-

trol over the amount of ink transferred by the roller 98 to the metering roller 96-97, a scraper is also provided. The scraper consists of an elongated thin doctor blade 191 (FIG. 10), preferably of resilient material such as spring steel, which is sandwiched between an upper support plate 192 and a bottom support plate 193. As best seen in FIG. 10, the outermost edge of the doctor blade 191 engages the outer periphery of the pickup roller 98 substantially above the axis thereof, it being understood that the roller 98 rotates in a counterclockwise direction as viewed in FIG. 10.

To regulate the pressure of the doctor blade 191 against the roller 98, the scraper is pivotally mounted between and supported from the rocker arms 171 by means of a pair of pivot pins 194 projecting inwardly from the rocker arms 171 and received in a pair of bracket portions 195 having U-shaped recesses 196 provided at the underside of the plate 193. A support plate 197 is detachably secured at the inner face of each of the rocker arms 171 by means of pins 198. Each plate 197 has at its lower end an inwardly extending ledge 199, and an angularly disposed adjustment screw 201 extends through a threaded opening in the ledge 199 and projects below the latter to engage the top plate 192 of the scraper. Since the screw 201 engages the scraper intermediate the pivot support pins 194 and the outer scraping edge of the doctor blade 191, it will be seen that the pressure of the doctor blade 191 against the pickup roller 98 can be regulated by adjustment of the screws 201 at each end of the scraper. At the same time, the entire scraper is readily removable from the printing machine when desired by loosening the adjustment screws 201, detaching the plates 197 from their pinned support on the arms 171, and lifting the scraper 191-192-193 from the pivot support pins 194. Likewise, the rocker arms 171 and the pickup roller 98 supported therebetween are readily removable from the side plates 56 and 57 by reason of the detachable pivot support at 177-178.

The metering roller 96-97, as heretofore mentioned, comprises a metal core or shaft portion 96 and an outermost covering 97. Suitable materials for the covering 97 are felt or gum rubber. Conveniently, a felt-covered roller may be provided by fitting a plurality of felt washers in side-by-side snug-fitting relation on the center shaft 96. Preferably, the shaft 96 is knurled and the stack of felt washers is held in tightly compressed relation by means of retainer rings having a snap fit on the shaft 96 at each end of the stack. Inasmuch as the covering 97 on the metering roller becomes saturated with ink during operation of the machine, especially if the covering is felt, it is desirable to prevent the ink from drying out when the machine is not in use. Accordingly, it is an important feature of the invention that the metering roller be quickly and easily removable from the machine so that the roller can be detached and immersed in an auxiliary ink bath at some convenient location outside of the machine whenever operation of the machine is terminated for any appreciable period of time. When it is desired to resume operation of the machine, the metering roller can be removed from the auxiliary ink bath and restored to the printing machine without any danger of drying out and becoming hard and ineffective.

The detachable mounting of the metering roller 96-97 is accomplished by means of a pair of inverted generally L-shaped brackets which are designated generally at 206 (FIGS. 6, 10, and 12). Each bracket 206 has a recessed upper corner portion 207 which is adapted to fit over a projecting lug 208 at the upper forward edge of the recess 172 in each of the side plates 56 and 57. Each bracket 206 is pivotally and detachably connected to its side plate by means of a removable pin 209 which is fitted through mating apertures in the bracket portion 207 and the lug 208. The shaft extensions 110 of the metering roller are journaled in the lower ends of the brackets 206. As seen in FIG. 12, one of the shaft extensions 110 projects be-

yond the side plate 56 and has the gear 111 mounted thereon. Each bracket 206 has a rearwardly extending arm portion 212 which overlies in vertically spaced relation the forwardly extending projection 173 of the corresponding side plate 56 or 57. An adjustment screw 213 extends loosely through an aperture 214 in the arm 212 and is threaded at its lower end into a threaded opening in the projection 173. A compression spring 216 coacts between the arm 212 and the projection 173 for normally urging the bracket 206 in a counterclockwise direction (as seen in FIG. 8) about its pivotal support 209, but by adjusting the screw 213 inwardly the bracket 206 is caused to pivot in a clockwise direction against the action of the spring 216. Thus, the pressure of the metering roller 96-97 against the inking roller 94 is readily adjusted to obtain the most effective operation.

The ease of removability of the metering roller is illustrated particularly in the exploded view of FIG. 12 wherein the pin 209 is shown as withdrawn and the bracket 206 has been detached from the lug 208. When this operation is accomplished at each side of the machine, it will be seen that both brackets 206 and the metering roller assembly including the gear 111 can be lifted bodily from the side plates 56 and 57 for immersion of the roller in an auxiliary supply of ink, as heretofore described.

The inking roller 94 which receives ink from the metering roller 96-97 and transfers it to the numbering roller 93 is also removably and adjustably mounted between the side frames 56 and 57. As best seen in FIG. 8, each of the side plates 56 and 57 is provided with a vertical slot 221 extending from the upper edge of the side plate and located forwardly of the enlarged recess 172 which accommodates the rollers 98 and 96-97. The wall thickness of the side plate at the opposite vertical edges of the slot 221 is reduced somewhat to provide pairs of oppositely disposed elongated grooves 222 at the corner edges of the slot. A generally rectangular bearing block 223 is slidably mounted in the slot 221 by means of grooves in the edges of the block which cooperate with the corner grooves 222 in the edges of the slot 221. The end shaft portions 105 of the inking roller 94 are journaled in suitable bearings in the bearing blocks 223. As will be evident from FIG. 6, the end shaft portion 105 at the drive end of the roll 94 projects beyond the side plate 56 and has mounted thereon the double spur gear 108 and the outermost spur gear 109.

A compression spring 226 is disposed in a recess 227 in each of the side plates 56 and 57 at the base of the slot 221 and engages the bottom of the bearing block 223 for normally urging the latter upwardly. A pressure block 228 extends across the open upper end of each slot 221 and has end recesses 229 (FIG. 6) which fit around lug portions 231 of reduced thickness at the upper edge of the side plate. A pair of removable pins 232, similar to the pins 209, extend through the ends of the pressure block 228 and the lugs 231 for detachably connecting the pressure block to the side plate. A threaded stud 233 extends through a threaded central opening 234 in the pressure block 228 and engages the upper end of the bearing block 223 for urging the latter inwardly in the slot 221 against the action of the spring 226. A lock nut 236 is threaded on the stud 233 at the outside of the pressure block 228 for locking the stud 233 in a predetermined adjusted position. As will be apparent, by adjustment of the studs 233, the positions of the bearing blocks 223 and the inking roller 94 journaled therein may be regulated so as to obtain the desired contact pressure between the inking roller 94 and the projecting type elements 121 at the periphery of the numbering roller 93.

Referring to FIGS. 3, 4, 5 and 8, it will be seen that when the side plates 56 and 57 are in downwardly pivoted printing position, the forward portions of the bottom edges of the side plates extend across the gap 48 in the table 32, and the end extremities of the side plates are received in a pair of recesses or notches 241 in the table

edge at the forward side of the gap 48. Vertically adjustable supports are mounted in the recesses 241 for engaging the lower edges of the side plates 56 and 57. Thus, a pair of slide support members 242 are secured to the underside of the table 32 and have channel-shaped extensions 243 which project upwardly into the recesses 241. The open sides of the channel-shaped extensions 243 face the gap 48 and are closed by cover plates 244 which are detachably mounted on the extensions 243, as by a plurality of screws 246. A support element 247 of rectangular cross section is slidably disposed within a rectangular slideway 248 defined by each of the channel-shaped extensions 243 and its cover plate 244. The upper end of each support element 247 has a circular cross section and a rounded end configuration, as at 249, for engaging the bottom edges of the side plates 56 and 57. Each support element 247 also has a threaded bore 251 extending upwardly from the lower end thereof, and a pair of elongated studs 252 and 253 have loose threaded connections at their upper ends in the threaded bores 251. The lower ends of the studs 252 and 253 are connected to a suitable adjusting mechanism for raising and lowering the support elements 247 in the slideways 248.

A pair of elongated channel members 256 and 257 are secured beneath the table 32 inwardly from the side edges thereof, as best seen in FIG. 4. A support plate 258 is secured to the lower edges of the channels 256 and 257 and extends transversely therebetween. A top plate 259 is secured in spaced relation above the plate 258 by means of a plurality of spacer blocks 261, 262, 263, 264, and 266 and a plurality of screws 267 interconnecting the same to form a housing for the adjustment mechanism. The lower end of the stud 252 extends through the top plate 259 and is journaled at its lower extremity in the bottom support plate 258 and a bearing pad 268. A worm gear 269 is mounted on the stud 252 between the plate 259 and the bearing pad 268. In a similar fashion, a form gear 271 is also mounted on the lower end of the stud 253, the gear 271 being disposed between the spacer blocks 264 and 266 and engaging a bearing pad 272.

The support plate 258 projects at one end beyond the channel 256 and is provided with an upright end plate member 273. An elongated shaft 274 is journaled at its opposite ends in the plate 273 and the spacer block 262 and extends through the spacer block 261. At the outer end of the shaft 274 an adjustment knob 276 is provided, and a worm 277 is mounted on an intermediate portion of the shaft 274 in engagement with the worm gear 269. Another shaft 278, longer than the shaft 274, is journaled at its opposite ends in the plate 273 and in the spacer block 266, the intermediate portions of the shaft extending through suitable openings in the spacer blocks 261, 262, 263, and 264. An adjustment knob 279 is affixed to the projecting outer end of the shaft 278 adjacent the knob 276, and a worm 281 is mounted at the opposite extremity of the shaft 278 in engagement with the worm gear 271.

As will be evident from the foregoing construction, the adjustment knobs 276 and 279 are conveniently located at the same side of the machine so that the operator can easily adjust the elevations of the support members 247 upon which the side plates 56 and 57 rest. Once the desired adjustment has been achieved, the knobs 276 and 279 can be locked in adjusted position by means of a pair of set screws 282 and 283 which extend upwardly through the bottom plate 258 and the end plate 273 into engagement with the shafts 274 and 278, respectively. As will be apparent particularly from FIG. 8, the described adjustment for the support elements 247 regulates the pressure of the type elements 121 against the impression roller 92, thereby providing an adjustment for the printing pressure on the web 33 which is engaged at its underside by the impression roller 92 and at its upper side by the numbering roller 93.

In order to prevent spattering of the ink during printing and to minimize solvent evaporation from the ink within the printing mechanism, a front shield member 286 (FIG. 8) of transparent plastic or the like is secured by means of a flange portion 287 to the lower edge of the front tie bar 61 and extends across the front of the machine between the side plates 56 and 57. Similarly, a top shield member 288 has a hinged connection 289 to the top edge of the tie bar 61 and extends rearwardly and downwardly to rest on the top plate 192 of the scraper. The top shield member 288 can easily be swung upwardly at the hinge 289 to permit access to the rollers and other mechanism protected thereby.

I claim:

1. A printing device comprising a base, means for feeding a web generally horizontally relative to said base, a frame swingably mounted on said base for pivotal movement between a generally horizontal printing position adjacent the web and an elevated non-printing position substantially away from the web, a plurality of rollers mounted in said frame and having driving connections therebetween, said rollers including a web-engaging roller for contacting and printing on the upper side of the web when said frame is in said printing position, drive means adapted to be connected to said rollers for rotating the same when said frame is in said printing position, and clutch means for connecting and disconnecting said drive means relative to said rollers, said clutch means comprising a first clutch element connected to one of said rollers, a second clutch element mounted on said base adjacent said frame, one of said clutch elements being shiftably mounted and being adapted to be engaged with the other said clutch elements when said frame is in said printing position, means connecting said second clutch element with said drive means, and manually operable means for shifting said one clutch element into and out of engagement with said other clutch element while said frame is in said printing position, whereby to permit pivotal movement of said frame to said non-printing position when said clutch elements are disengaged.

2. The device of claim 1 further characterized in that said drive means is mounted on said base and said clutch means is arranged for connecting and disconnecting said drive means relative to said web-engaging roller.

3. The device of claim 1 further characterized in that an impression roller is mounted on said base for engaging the underside of the web in opposed relation to said web-engaging roller when said frame is in said printing position, said drive means being connected to said impression roller, and said clutch means comprises a driven clutch element connected to said web-engaging roller, a driving clutch element shiftably mounted on said base adjacent said frame and adapted to be engaged with said driven clutch element when said frame is in said printing position, gear means interconnecting said impression roller and said driving clutch element, and manually operable means for shifting said driving clutch element into and out of engagement with said driven clutch element.

4. The device of claim 1 further characterized in that said frame comprises a pair of spaced parallel side plates with said rollers mounted therebetween and said web-engaging roller has means for removably journaling the same in said side plates.

5. The device of claim 4 further characterized in that a pair of stub shafts are journaled in said side plates and said web-engaging roller is detachably engageable at its ends with said stub shafts, one of said stub shafts being mounted for limited axial movement in one of said side plates and having manually operable means mounted on said frame and connected to said one stub shaft for mounting of said web-engaging roller between said stub shafts axially shifting the same to facilitate mounting and demounting of said web-engaging roller between said stub shafts.

6. The device of claim 5 further characterized in that said one stub shaft has gear means mounted thereon and connected to cooperating gear means on another of said rollers, and said clutch means includes a driven clutch element connected to the other of said stub shafts, a driving clutch element shiftably mounted on said base adjacent said frame and adapted to be engaged with said driven clutch element when said frame is in said printing position, gear means interconnecting said drive means and said driving clutch element, and manually operable means for shifting said driving clutch element.

7. The device of claim 1 further characterized in that said web-engaging roller comprises a cylindrical roller body with a plurality of axially-extending circumferentially spaced grooves at its outer periphery, a plurality of elongated strips axially insertable in and removable from said grooves, and type elements carried by said strips and adapted to project from the periphery of said body for engaging the web, said roller body being detachable from said frame to permit insertion and removal of said strips.

8. The device of claim 1 further characterized in that said frame comprises a pair of spaced parallel side plates with said rollers mounted therebetween and said base includes a pivot shaft extending across said base with said side plates pivotally supported thereon and means extending across said base in the path of swinging movement of said side plates for limiting the extent of movement of said plates away from the web and retaining the same in said non-printing position.

9. The device of claim 1 further characterized in that said frame comprises a pair of spaced parallel side plates with said rollers mounted therebetween and said base includes a pivot shaft extending across said base with said side plates pivotally supported thereon, said rollers also including an ink pickup roller, and an ink pan is removably supported on said base between said side plates and is adapted to have said pickup roller immersed in an ink supply contained therein when said frame is in said printing position, said side plates being pivotally movable without effecting pivotal movement of said ink pan.

10. The device of claim 9 further characterized in that said ink pan is adjustably supported from said pivot shaft in spaced relation above said table and the web thereon.

11. The device of claim 1 further characterized in that said frame comprises a pair of spaced parallel side plates with said rollers mounted therebetween and said rollers include an ink pickup roller and a metering roller engaging said pickup roller, said pickup roller being adapted to be immersed in an ink supply when said frame is in said printing position, said side plates including a pair of rocker arms pivotally supported thereon, said pickup roller being journaled between said rocker arms, and adjustable means coacting between said side plates and said rocker arms for regulating the pressure between said pickup roller and said metering roller.

12. The device of claim 11 further characterized by the provision of adjustable scraper means mounted between said rocker arms and engaging said pickup roller.

13. The device of claim 11 further characterized in that said side plates also include a pair of detachable support brackets having said metering roller journaled therebetween, said brackets and said metering roller being removable as a unit from said side plates.

14. The device of claim 1 further characterized in that said frame comprises a pair of spaced parallel side plates with said rollers mounted therebetween, and said rollers include an ink pickup roller adapted to be immersed in an ink supply when said frame is in said printing position, a metering roller engaging said pickup roller, and an inking roller engaging said metering roller and said web-engaging roller for transferring ink therebetween, said side plates also including a pair of support brackets pivotally mounted thereon and having said metering roller journaled therebetween, and adjustable means coacting between said side plates and said brackets for regulating

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the pressure between said metering roller and said inking roller.

15. The device of claim 1 further characterized in that said frame comprises a pair of spaced parallel side plates with said rollers mounted therebetween, and said rollers include an ink pickup roller adapted to be immersed in an ink supply when said frame is in said printing position, a metering roller engaging said pickup roller, and an inking roller engaging said metering roller and said web-engaging roller for transferring ink therebetween, said side plates also including a pair of support blocks movably mounted thereon and having said inking roller journaled therebetween, and adjustable means coaxing between said blocks and said side plates for regulating the pressure between said inking roller and said web-engaging roller.

16. The device of claim 1 further characterized in that said frame comprises a pair of spaced parallel side plates with said rollers mounted therebetween, and said rollers include an ink pickup roller adapted to be immersed in an ink supply when said frame is in said printing position, a metering roller engaging said pickup roller, and an inking roller engaging said metering roller and said web-engaging roller for transferring ink therebetween, said side plates having a first pair of recesses with a pair of rocker arms pivotally supported therein and said pickup roller being journaled between said rocker arms, a pair of support brackets disposed in said first recesses and detachably and pivotally mounted on said side plates with said metering roller being journaled between said brackets, and said side plates having a second pair of recesses with a pair of support blocks slidably mounted therein and having said inking roller journaled therebetween, and a plurality of adjustable means coaxing between said side plates and said rockers, said brackets, and said blocks, respectively, for regulating the pressure between the rollers.

17. The device of claim 1 further characterized in that an impression roller is mounted on said base for engaging the under side of the web in opposed relation to said web-engaging roller when said frame is in said printing position, and adjustable means is provided on said base which is engagable with said frame when the latter is in said printing position for regulating the pressure of said web-engaging roller against said impression roller and the web therebetween.

18. The device of claim 17 further characterized in that said base includes a horizontal table having the web fed along its upper surface, said frame comprises a pair of spaced parallel side plates with said rollers mounted therebetween and means pivotally supporting said side plates above said table, and said adjustable means comprises a pair of support elements mounted on said table

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adjacent said impression roller and adapted to be engaged by the lower edges of said side plates when said frame is in said printing position, said support elements having means for adjusting the vertical position thereof relative to said table.

19. A printing device comprising a base, means for feeding a web generally horizontally relative to said base, a frame swingably mounted on said base for pivotal movement between a generally horizontal printing position adjacent the web and an elevated non-printing position substantially away from the web, a plurality of rollers mounted in said frame and having driving connections therebetween, said rollers including a web-engaging roller for contacting and printing on the upper side of the web when said frame is in said printing position, drive means adapted to be connected to said rollers for rotating the same when said frame is in said printing position, and clutch means for connecting and disconnecting said drive means relative to said rollers, said clutch means comprising a driven clutch element connected to one of said rollers and a driving clutch element shiftably mounted on said base adjacent said frame and adapted to be engaged with said driven clutch element when said frame is in said printing position, means connecting said driving clutch element with said drive means, and manually operable means for shifting said driving clutch element into and out of engagement with said driven clutch element, whereby to permit pivotal movement of said frame to said non-printing position when said clutch elements are disengaged.

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