

Dec. 15, 1953

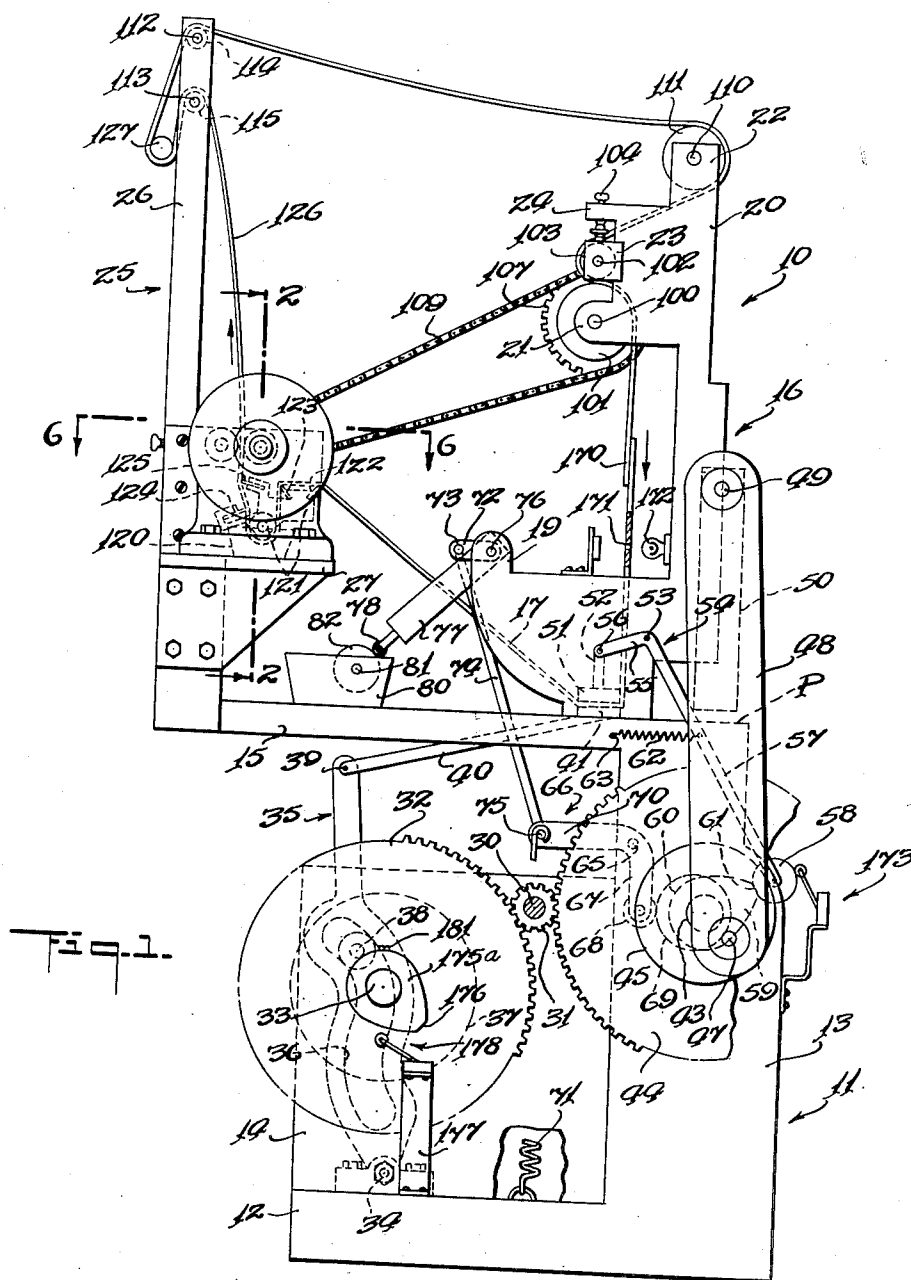
E. A. GILLIS

2,662,471

INTAGLIO ENGRAVING PRESS

Filed April 6, 1950

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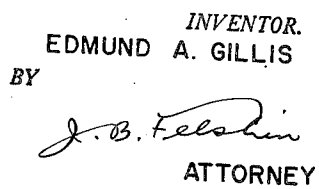


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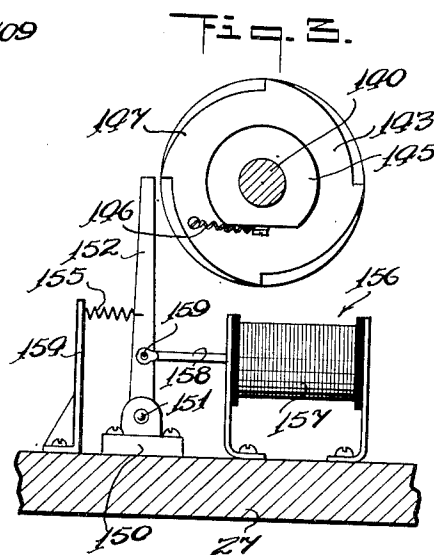
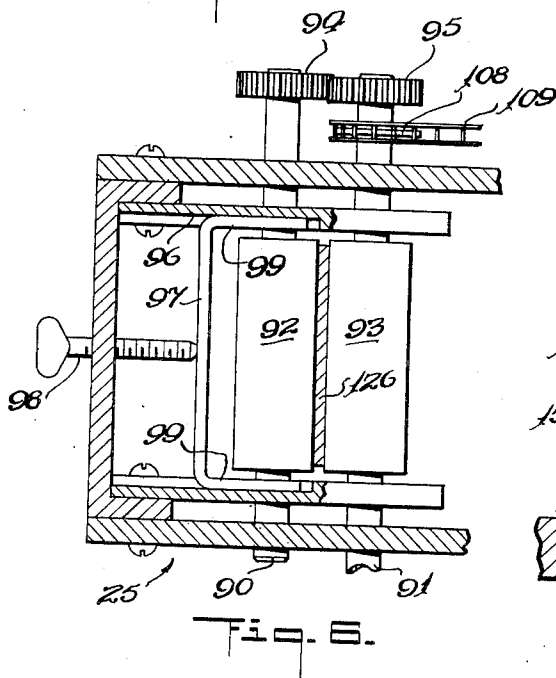
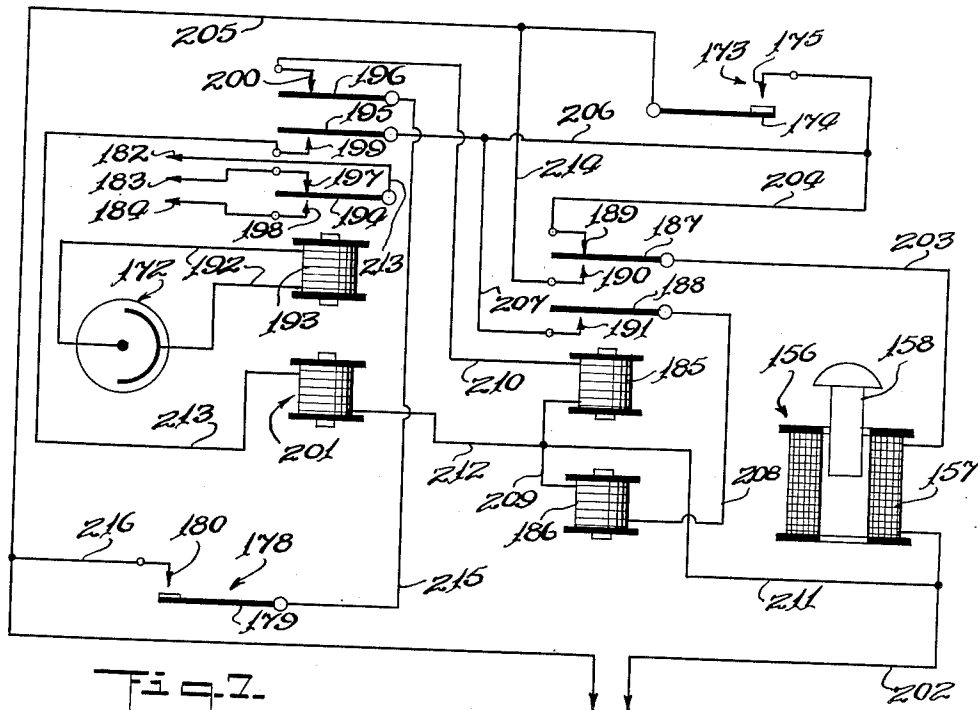
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4 Sheets-Sheet 3



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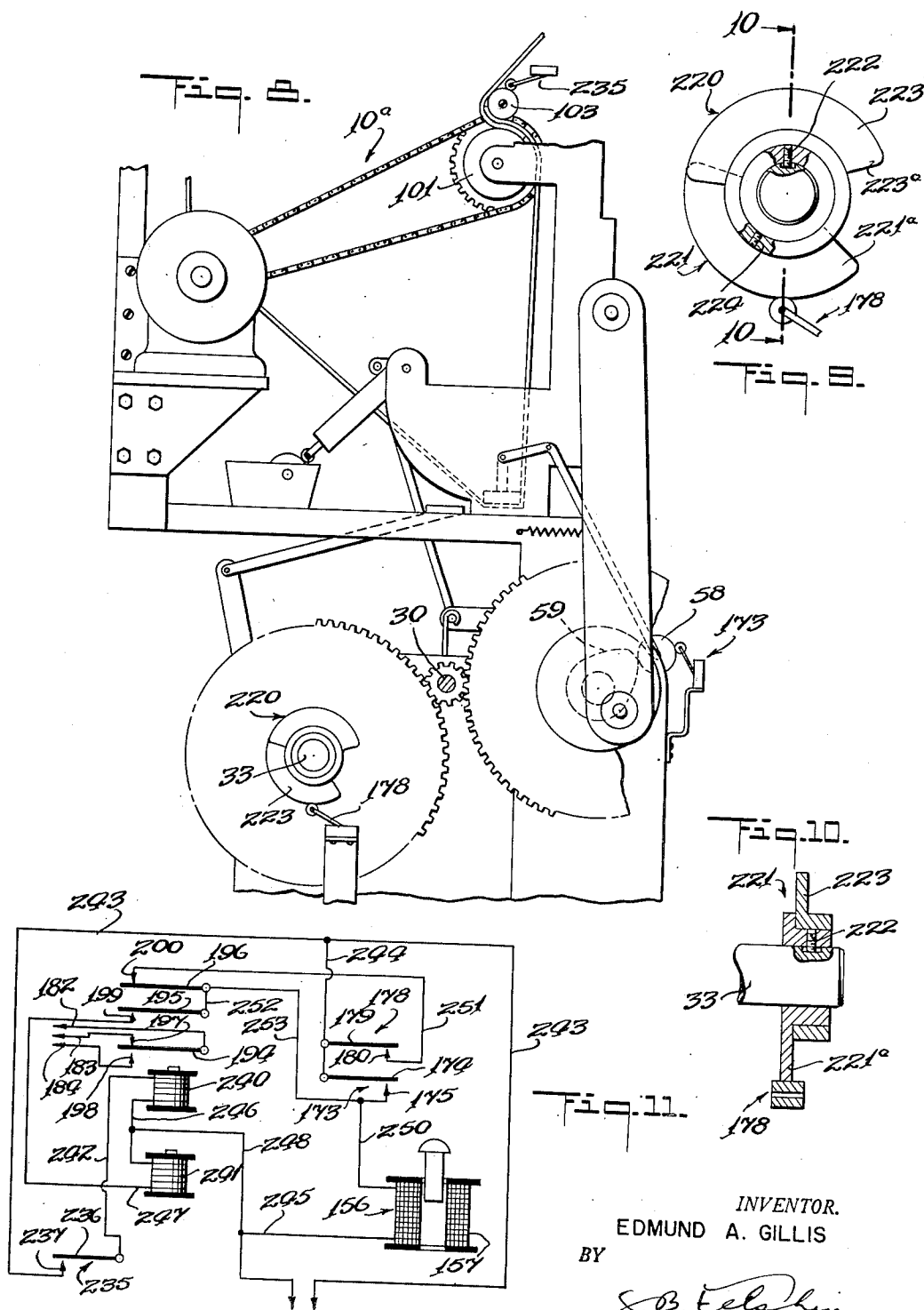
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4 Sheets-Sheet 4



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2,662,471

INTAGLIO ENGRAVING PRESS

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Application April 6, 1950, Serial No. 154,253

15 Claims. (Cl. 101-164)

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This invention relates to intaglio engraving presses. It is particularly directed to an intaglio engraving press, such as a die stamping press, having means for feeding an endless belt for wiping the die.

One object of this invention is to provide in a machine of the character described, a separate power drive for feeding the belt.

In intaglio engraving presses such as die stamping presses, the standard equipment includes means for raising and lowering a wiping pad. When lowered, the pad presents a wiping section of the belt to the die. When the pad is raised, the belt will not contact the die. When the pad is raised, the belt is advanced in regular increments to repeatedly present clean sections of belt to the die for each wiping operation. At the moment of wiping contact, the belt remains stationary. It is therefore another object of this invention to provide highly improved means for synchronizing the belt drive to the imprinting cycle of the press, and to provide means for varying the length of the increments of belt feed, so that after the die is wiped, only a desired length of belt is fed, sufficient to bring the part of the belt soiled with ink beyond the pad, so that the next time the die rubs or wipes against the belt, a clean portion of the belt is presented, and whereby the portions of the belt between wiped portions is minimized.

The belt is usually formed with a seam. This seam, if allowed to wipe the die, would cause one or more spoiled imprints. It is therefore yet another object of this invention to insure movement of the seam from in advance of the pad to a position entirely beyond the pad in a single increment of movement, so that the seam will not wipe the die.

It is a further object of this invention to provide in a machine of the character described, a means for accelerating movement of the wiping belt when the seamed portion of the belt approaches the die so that the seam will completely and quickly pass the wiping section without allowing the seam to wipe the die.

On many engraving die stamping presses which can utilize endless wiping belts, the actuating mechanism formerly used to feed wiping paper from one roll and rewind the paper on another roll is not strong enough to properly drive an endless wiper belt, particularly when the endless wiper belt must contain a selected section of the belt under tension, as in the machine described and claimed in application of Robert N. Steffens, application No. 736,555, filed on March 22, 1947,

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for Die Stamping Presses and Die Wipers Therefor, now U. S. Patent Serial No. 2,586,108, patented February 19, 1952. For this reason in accordance with the present invention, the means for driving the belt is separate from the means which operates the remaining part of the intaglio press. The advantage of such construction would be that the extra power supplied by the separate driving means for the belt would relieve the driving means for the remainder of the machine.

Yet another object of this invention is to provide a machine of the character described having means to cause imperfect parts of the belt, or seamed portions of the belt, to pass the die wiping station and preventing wiping of the die against such imperfect parts of the belt, or against the seams. Such an arrangement will permit the use of shorter belts and will also permit patching of old belts because the numerous seams would all be passed over at the wiping point without wiping the die or spoiling any imprints. Such arrangement would furthermore permit longer use of worn belts.

In accordance with this invention a two speed motor can be used for driving the belt, the arrangement being such that a lower normal speed would be used for ordinary feeding of the belt, whereas the motor would be speeded up to pass imperfect or seamed portions of the belt. Such arrangement would allow a lower normal speed of the belt, which would result in less wear on the belt and less shock as power is turned on and off, and also would permit more parts of the belt to remain in the cleaning solution which cleans the ink off the belt.

A still further object of this invention is to provide a strong and durable machine of the character described which shall be relatively inexpensive to manufacture, which shall be sure and positive in operation and yet practical and efficient to a high degree in use.

Other objects of this invention will in part be obvious and in part hereinafter pointed out.

The invention accordingly consists in the features of construction, combinations of elements, and arrangement of parts (and method steps), which will be exemplified in the construction hereinafter described, and of which the scope of invention will be indicated in the following claims.

In the accompanying drawings in which is shown various illustrative embodiments of this invention,

Fig. 1 is a front elevational view of a machine embodying the invention;

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Fig. 2 is an enlarged cross-sectional view taken on line 2—2 of Fig. 1;

Fig. 3 is a cross-sectional view taken on line 3—3 of Fig. 2;

Fig. 4 is a partial view of the structure shown in Fig. 3, with parts in cross-section;

Fig. 5 is a cross-sectional view taken on line 5—5 of Fig. 2;

Fig. 6 is a cross-sectional view taken on line 6—6 of Fig. 1;

Fig. 7 is a wiring diagram illustrating the electrical hook-up for controlling the solenoid which controls the belt drive clutch;

Fig. 8 is a view similar to Fig. 1 but illustrating a modified construction;

Fig. 9 is an enlarged view of the cam controlling switch for stopping the drive for the belt;

Fig. 10 is a cross-sectional view taken on line 10—10 of Fig. 9; and

Fig. 11 is a wiring diagram for the machine shown in Fig. 8.

Referring now in detail to the drawing, 10 designates an intaglio printing press embodying the invention. For purpose of illustration, machine 10 has been shown as a die stamping press for printing engraved stationery. The same comprises a frame 11 having a base portion 12 from which extends upwardly a frame portion 13. Also supported on the base 12 are a pair of vertical frame plates 14. Extending from portion 13 is a horizontal frame portion or bed 15. Mounted on the frame 11 is a second frame 16 comprising a base portion 17 mounted on the frame 11. Extending from the base 17 of the frame 16 is an upstanding ear 19. Also extending upwardly from base 17 is a vertical frame portion 20 provided with forwardly extending ears 21 and upstanding ears 22. Slidably mounted on frame portion 20 are bearing blocks 23. Extending from said portion 20 and disposed above said bearing blocks are fingers 24. Attached to frame portion 15 is a frame portion 25 comprising an upstanding arm 26 and a horizontal bracket or shelf support 27, for the purpose hereinafter appearing.

Rotatably mounted on the plates 14 is a horizontal shaft 30 carrying a pinion 31 meshing with a gear 32, mounted for rotation on a shaft 33 journaled on said plates. Pivoted to the base 12 as at 34 is a lever 35 having a curved cam slot 36. Fixed for rotation with the shaft 33 is a disc 37. Mounted eccentrically on said disc is a roller or pin 38 received within the curved slot 36. The slot 36 is substantially S shaped as shown. Pivoted to the upper end of the arm 25 as at 39 is a link 40. Mounted on the outer end of the arm is a die 41 which slides in suitable guides on the bed or frame portion 15.

Mounted for rotation on the frame portion 13 is a shaft 43. Fixed to the shaft is a gear 44 which likewise meshes with the pinion 31. Fixed to said shaft is a disc 45. Attached to said disc is a pin 47. Pivoted to the pin 47 is a link 48. The upper end of the link is pivoted as at 49 to a ram 50. It will now be understood that whereas the die 41 reciprocates in a horizontal direction on the bed 15, the ram will be reciprocated up and down.

Slidably mounted on the machine in any suitable manner for vertical up and down movement between suitable guides is a wiping pad 51. Extending upwardly from the wiping pad is an arm or stud 52. Pivoted to the frame 16 in any suitable manner as at 53 is a bell crank 54. Said bell crank has an arm 55 connected by a

pin and slot connection as at 56 to the arm 52 to the wiping pad. Said bell crank 54 has a second arm 57 carrying a roller or follower 58 at its lower end. Attached to the shaft 43 is a cam 59 having a low dwell portion 60 and a high dwell portion 61. As the cam 59 rotates the bell crank 54 will be oscillated in synchronization with the movement of the die 41 for lowering and raising the wiping pad. The timing and arrangement of the cams 36, 59, and the gears is such that the pad 51 comes down just before the die 41 passes the wiping pad (going to the right, looking at Fig. 1). A coil tension spring 62 interconnects arm 57 of the bell crank 54 with the frame, as at 63, so that the follower 58 will remain in contact with the cam as the cam rotates.

Means is provided for applying ink to the top face of the die as the die moves to the left, looking at Fig. 1 of the drawing. To this end there is pivoted to the frame 11 as at 65, a bell crank 66 having a downwardly extending arm 67 carrying a roller or follower 68, contacting a cam disc 69, mounted on the shaft 43 and rotating therewith. The bell crank 66 further comprises a horizontal arm 70 connected by a coil tension spring 71 to the base 12 for retaining the follower 68 in engagement with the cam 69. Pivoted to the ear 19 is an arm 72 pivoted as at 73 to a link 74 which is pivoted to the arm 70 as at 75. It will now be understood that as the machine operates, the bell crank 66 will be oscillated for moving the link 74 up and down and thereby oscillating the arm 72. The arm 72 is fixed to a shaft 76 journaled on the ear 19.

Fixed to the shaft 76 is oscillating arm 77 carrying a transfer roller 78 at its lower end. Mounted on the bed 15 is a container or trough 80 in which is rotatably mounted on a shaft 81, an ink roller 82. The roller 82 projects above the receptacle 80. As the arm 77 moves in a clockwise direction, looking at Fig. 1, roller 78 contacts roller 82. As the arm 77 oscillates in a counterclockwise direction the roller 78 contacts the top face of the die 41 for transferring ink from the roller 82 to the die. The operations are so related that the roller 78 will be in its downward position as the die passes the roller.

Means is provided to wipe the face of the die so as to clean the face of ink, while permitting ink to remain in the engraved portions or grooves in the die. To this end there is rotatably mounted on the frame 25 a pair of parallel shafts 90 and 91 carrying rollers 92 and 93 respectively. On said shafts are pinions 94 and 95 which intermesh. On the frame 25 are horizontal guides 96. Slidably mounted on said guides 96 is a U shaped bracket 97. Screwed to the frame 25 is a screw 98 which presses against the bracket 97. The shaft 90 is journaled in the opposite parallel arms 99 of the bracket 97.

On the ears 21 is rotatably mounted a shaft 100 carrying a roller 101. Journaled on the sliding blocks 23 is a shaft 102 disposed above the shaft 100. Carried by the shaft 102 is a roller 103. Screwed to the fingers 24 is a screw 104 which serves to press the sliding blocks 23 downwardly for pressing the roller 103 toward the roller 101. Fixed to shaft 100 is a sprocket wheel 107. Mounted on shaft 91 is a sprocket wheel 108. The sprocket wheels 107 and 108 are interconnected by a sprocket chain 109. Thus when the shaft 91 is rotated, in the manner herein-after to be described, the rollers 93 and 92 will be rotated due to the meshing of the pinions

95 and 94. Also, the roller 100 will be rotated due to the connection of the sprocket chain 109 with the sprocket wheels 108 and 107.

On the upstanding ears 22 is a horizontal shaft 110 carrying an idler roller 111. On the upstanding frame 26 are shafts 112 and 113 carrying idler rollers 114 and 115. On the frame or bracket 27 is a trough or pan 120. Rotatably mounted therein is a roller 121. Fixed to the frame in any suitable manner are scrapers 122 and 123 at one side of the roller and scrapers 124 and 125 at the opposite side of the roller.

There is further provided a die wiping belt 126 which passes upwardly between the rollers 92 and 93, then over the idler roller 115, then downwardly around the weight 127, then upwardly around the idler roller 114, then over and around the idler roller 111, then around the roller 103, then passing between the rollers 103 and 101. The belt then extends downwardly and beneath the wiping pad 51. The belt then extends over the scrapers 122 and 123 and then down and around the roller 121 in the trough 120. The belt then contacts successively the scrapers 124 and 125. Ink solvent solution is placed in the trough 120 to dissolve ink from the belt. Means hereinafter described is provided for rotating the shaft 51. It will now be understood that when the pad 51 comes down the die 41 moves to the right against the portion of the belt which contacts the pad, to wipe the surface of the die clean. The die then moves to the right over to a platen P, at which time the work to be printed is placed on the platen and the ram 52 comes down and causes the printing operation. When the die 41 passes the portion of the belt in contact with the pad 51, the belt is stationary and does not move.

Means is provided to advance the belt at a time when the die is not in contact with the belt, at which time the pad is raised from its downmost position. To this end the shaft 91 passes through a bearing 130 in frame plate 131 fixed to the frame 25. On bracket 27 is an upstanding plate 132 provided with a ball bearing 133. Mounted on the bracket 27 is an electric motor 134 provided with a central shaft 135. Fixed to the shaft 135 is a coupling member 136 which is keyed to the hub 139a of the outer housing or driver 137 of a quarter revolution clutch 138. Clutch 138 may be of any suitable well known type such as the Hilliard fractional horsepower single revolution clutch, except that the clutch 138 is changed from a single revolution clutch to a quarter revolution clutch. A positive clutch utilizing laterally engaging jaws may also be employed. The clutch 138 comprises a central hub or driven member 139 disposed within the housing 137 and keyed to a coaxial shaft 140 journaled in the hub 139a. The hub 139 is formed with outer flat surfaces 139a, and rollers 141 are received between the surfaces 139a and the inner surface of housing 137. Loosely mounted on the shaft 140 is disc 142 provided with fingers 144 extending into the spaces which receive the balls 141. Fixed to the shaft 140 adjacent disc 143 is a hub 145 connected by coil tension spring 146 to the disc 143. The disc 143 is formed with four ratchet teeth 147. Although four ratchet teeth are shown, any suitable number may be employed. The spring 146 tends to rotate the disc 143 relative to the shaft 140, so that the fingers 144 press the balls 141 in a direction for wedging the drive housing 137 to the driven hub 139 so that when the motor 134 is rotating, the shaft 140 will be rotated.

Means is provided to declutch the clutch 138. It will be further understood that should the disc 143 be stopped while the housing continues turning, the rollers 141 will be released from wedging engagement between the hub 139 and the housing 137 by fingers 144, so that continued rotation of the housing will not drive the shaft 140 any more until the disc 143 is again released. At such time spring 146 again tends to rotate the disc relative to the hub so that fingers 144 press the rollers into wedging engagement to drive shaft 140.

Means is provided to control the clutch 138. To this end there is pivoted to bracket 150 on bracket 27, as at 151, an arm 152, the upper free end of which is adapted to be moved into or out of the path of the ratchet teeth. On bracket 27 is a bracket 154 and interconnecting said bracket with the lever 152 is a coil tension spring 155 to normally retain the arm 152 out of engagement with respect to the disc 143. Mounted on the bracket 27 is a solenoid 156 comprising a coil 157 and an armature 158. The armature 158 is pivotally connected as at 159 to the lever 152. When the coil 157 is energized arm 152 is moved to the right, looking at Fig. 3, and the upper end of the lever 152 moves into the path of the ratchet teeth so that when the next tooth engages the end of the lever, the disc 143 will be halted and continued movement of the housing 137 will release the rollers from clutching engagement and therefore stop the rotation of the shaft 140. The control of the solenoid will be described hereinafter.

The shaft 140 passes through the bearing 133 on the support 132. Fixed to the shaft 140 is a coupling 160 keyed to the hub 161 of an outer housing 162 of an overrunning clutch 163. The clutch 163 may be of any suitable construction such as the Hilliard Overrunning Clutch. It will be noted that the shaft 91 is coaxial with the shaft 140 and is journaled in the hub 161. Keyed to said shaft 91 is a hub 164 formed with notches 165 in which are received rollers 166 adapted to be wedged against the inner surfaces of the housing 162. When the shaft 140 is rotating, housing 162 will likewise rotate in a counterclockwise direction, looking at Fig. 5, causing the rollers 166 to turn the hub 164 and consequently the shaft 91. A closure plate 168 fixed to the housing 162 closes the same. The roller 93 may be advanced even while the housing 162 is not rotating. Thus the shaft 91 and consequently the hub 164 may be rotated in a counterclockwise direction, looking at Fig. 5, even when the housing 162 is stationary, and in such case the rollers merely move back against spring pressed pins 167.

While the clutches 138 and 163 have been described and illustrated in detail, it will be understood that any suitable clutches for the purpose intended may be substituted for the clutches shown. Such clutches are well known and common. It will now be understood that when the motor 134 is energized and solenoid 156 is deenergized, the roller 93 will be rotated and the belt will hence be advanced.

The sprocket wheels 107 and 108 are so selected that the rollers 92, 93 will rotate at somewhat greater peripheral speed than the roller 101, so that the portion of the belt passing between the rollers 101, 103 and down around the wiping pad 51 and through the various scrapers and up to the rollers 92, 93 will be under a tension greater than the remainder of the belt.

Means is provided to control the energization

and deenergization of the solenoid 156 so as to synchronize the advance of the belt with the movement of the die 41 and the wiping pad 51, and also to vary the length of belt fed after each wiping operation to correspond to the size of the die being wiped and to minimize the length of unwiped portions between the wiped portions. The control of the operation of said solenoid 156 also in accordance with the present invention includes means to cause the seam in the belt to run past the wiping pad so as to make sure that the die does not wipe against the seam, as such operation is likely to cause spoilage of imprints.

In the drawing, 170 designates the seam in the belt and 171 designates a hole punched in the belt in advance of, through, or near the seam. On the frame 18 and on opposite sides of the belt and above the wiping pad is a photoelectric cell 172 so located that normally the belt prevents a light beam from passing through the belt. When the opening 171 passes the photoelectric cell the light beam passes through said opening. The purpose of this photoelectric cell will be apparent hereinafter.

Also fixed to the frame 18 is a normally open switch 173. Switch 173 comprises a switch arm 174 and a fixed contact 175. The switch 173 is so placed that when the cam 59 pushes the follower 58 to the right, looking at Fig. 1, for depressing the wiping pad, the switch 173 will close and will be maintained closed while the dwell portion 61 of the cam is in contact with the follower 58. When the dwell portion 61 passes the follower and the wiping pad raises, the switch 173 will open.

On shaft 33 is a cam 175a having a high portion 176. Fixed to the base 12 is a bracket 177 and mounted thereon is a normally open switch 178, comprising a switch arm 179 and a fixed contact 180. As the high part 176 of the cam 175a passes the switch 178 the switch is closed and the switch will open when the cam passes said switch. The cam 175a is adjustable angularly on the shaft 33 and may be fixed to the shaft in any desired adjusted angular position by a set screw 181.

It will be noted that the gears 32 and 44 rotate in the same direction. Looking at Fig. 1 these gears rotate in a clockwise direction.

The cams 59 and 175a are so arranged that the cam 59 will pass beyond the follower 58 before the cam 175a closes the switch 178. By properly adjusting the cam 175a the angle of rotation of cam 59 beyond follower 58 before the cam 175a closes the switch 178 may be adjusted.

The motor 134 is preferably a two speed motor. It has a common terminal lead 182, a terminal lead 183 connected to the low speed side of the motor, and a terminal 184 connected to the high speed side of the motor.

In Fig. 7 is shown a wiring diagram for the control of the motor 134 and the solenoid 156. The electric controls include a latching relay 185 and a releasing relay 186. When the relay 185 becomes energized it is latched in energizing condition. When the relay 186 is energized it releases the latching relay 185. The latching relay 185 controls a pair of switch arms 187 and 188. The switch arm 187 normally engages a fixed contact 189. When the latching relay 185 is energized the switch arm 187 moves out of engagement with the fixed contact 189 and into engagement with a fixed contact 190. The switch arm 188 is normally open but when the latching relay 185 is energized it moves into engagement with a fixed contact 191. When the releasing relay 186 is

energized to release the latching relay 185, switch arm 188 moves to its normally open position, and switch arm 187 moves from contact 189 to contact 190.

The photoelectric cell 172 is so arranged that when a light beam passes through the opening 171 said photoelectric cell will, through wiring 192, energize a latching relay 192a. Said latching relay 192a controls switch arms 193, 195, and 196. The switch arm 194 normally engages a fixed contact 197 connected to the terminal 183. When the latching relay 192a is energized switch arm 194 moves away from fixed contact 197 and into engagement with a fixed contact 198 connected to the terminal 184. The switch arm 195 is normally open but when relay 192a is energized said switch arm moves into engagement with a fixed contact 199. The switch arm 196 is normally in engagement with a fixed contact 200 but when the relay 192a is energized the switch arm 196 moves away from the fixed contact 200 to open position. When the latching relay 192a becomes energized it latches in energized condition. There is further provided a releasing relay 201 which when energized releases the latching relay 192a to return the switch arms 194, 195, and 196 to their normal positions.

One side of the coil 157 of the solenoid 156 is connected by wire 202 to one side of the power line. The other side of the coil 157 is connected by wire 203 to the switch arm 187. The fixed contact 189 is connected by wire 204 to the fixed contact 175. The switch arm 174 is connected by wire 205 to the other power lead. The wire 204 is connected by wire 206 to the switch arm 195. Wire 206 is connected by wire 207 to the fixed contact 191. Switch arm 188 is connected by wire 208 to one side of the relay 186. The other side of the relay is connected by wire 209 to one side of the latching relay 185. The other side of the latching relay 185 is connected by wire 210 to the fixed contact 200. Wire 209 is connected by wire 211 to wire 202, and by wire 212 to one side of the releasing relay 201. The other side of said releasing relay 201 is connected by wire 213 to the fixed contact 189. Switch arm 194 is connected by wire 214 to the common terminal 182 of the motor. Fixed contact 190 is connected by wire 214 to wire 205. Switch arm 179 is connected by wire 215 to the switch arm 196. The fixed contact 180 is connected by wire 216 to the wire 205.

The operation of the control mechanism will now be described. As the machine operates, cam 59 will engage the follower 58 and lower the wiping pad 51 as the die 41, moving to the right looking at Figure 1, approaches the portion of the belt engaging the die. Before the die 41 reaches the belt, switch 173 is closed so that the switch arm 174 contacts the fixed contact 175, thus completing a circuit through the solenoid 156, through switch arm 187, and fixed contact 189. Said solenoid being energized, lever 152 moves to the right into the path of a tooth 147. When the first tooth contacts said lever, the clutch 133 is declutched and the roller 93 stops to stop the advance of the belt. At this time the motor is running on low speed as the switch arm 194 engages the fixed contact 197 which is connected to the low speed terminal 183. While the motor keeps running at low speed, rotation of the shaft 91 ceases and hence the belt is not being fed and is stationary. While the belt is stationary and the wiping pad 51 is down, the die 41 wipes against the portion of the belt con-

tacting the wiping pad. After the die passes the wiping pad, going to the right, the cam 59 passes the follower 58 and the wiping pad starts coming up, and switch 173 opens. At this time the solenoid 156 is deenergized and the motor 134 rotates the shaft 91 at low speed. However, when the cam 175a closes the switch 173 a circuit is closed through the latching relay 185, through switch 196, 200, thereby moving switch arm 187 out of engagement with respect to fixed contact 189 and into engagement with the fixed contact 190. Also, switch arm 188 moves into engagement with fixed contact 191. This operation completes a circuit through the solenoid through switch 187, 190, and the clutch is again declutched to stop the feeding of the belt.

Since the angular position of the cam 175a may be adjusted, the length of feed of the belt after each wiping operation may be regulated. Since the latching relay 185 when energized stays in latched condition, opening of the switch 173 does not deenergize the solenoid 156. The latching relay 185 remains in latched condition until the cam 59 again causes closure of the switch 173. When the switch 173 again closes, the circuit is completed through said switch and through switch 198, 191 through the releasing relay 186, thereby releasing the relay 185 and permitting switch arms 187 and 188 to move to their normal positions. The solenoid however, remains energized through the switch 173 until the switch 173 again opens, deenergizes the solenoid and causes the belt to advance.

As the belt continues to be advanced by increments, when the opening 171 passes the photoelectric cell 172, the latching relay 193 becomes energized to move switch arm 194 from contact 197 to contact 198 to connect the motor for high speed operation, since in such case the common terminal 182 is connected to the high speed terminal 184. At the same time switch arm 195 moves down into engagement with contact 199 and switch 196 moves away from contact 200. Since switch 196, 200 opens, the latching relay 185 cannot be energized even if switch 173 closes. Obviously the opening 171 will pass the photoelectric cell while the belt is being advanced, and that would be during the period after switch 173 has been opened and before switch 178 has been closed. Since the closure of switch 173 prevents energization of relay 185 and the energization of the solenoid through the switch 187, 190, said solenoid will remain deenergized and the belt will continue advancing until switch 173 again closes. At that time the circuit is completed through switch 173 and switch 195, 199, through the releasing relay 201 which releases the latching relay 193 and permits movement of the switch arms 194, 195, and 196 back to normal condition. With such construction the seam will pass the wiping pad and thereby prevent spoilage of imprints.

Although the opening 171 is shown in the drawing as being in advance of the seam 170, it will be understood that an opening can be punched in the belt in advance of any imperfection or defect in the belt to make sure that such imperfection or defect does not stop at the wiping pad, but passes the same.

Referring now to Figs. 8 and 11 there is illustrated a modified construction similar to the construction described hereinabove except for the differences to be noted hereinafter.

In the machine 16a shown in Fig. 8, a cam 220 on shaft 33 replaces the cam 175a. Said cam 220 comprises a fixed cam part 221 which may

be fixed to the shaft by a set screw 222 and an adjustable cam part 223 which may be adjusted on the shaft by means of an adjusting screw 224. The cams overlap in all adjusted positions as shown in Fig. 9 of the drawing. The cam parts 221, 223 are adapted to close the switch 173 except for the part between adjacent ends 221a and 223a of the cam parts 221, 223. On the machine is a micro switch 235 adapted to be contacted and closed when a seam on the belt passes between roller 101 and 103 and raises roller 103. The switch 235 may comprise a switch arm 236 and fixed contact 237. The switch 235 replaces the photoelectric cell of Fig. 1.

Referring now to Fig. 11 there is shown a wiring diagram illustrating the control for the machine 16a. Said controls comprise common terminal 182 for the motor, connected to switch arm 194 normally in engagement with a fixed contact 197 connected to the low speed terminal 183 of the motor. The arm 194 is adapted to move out of engagement with contact 197 and into engagement with contact 198 connected to the high speed terminal 184 of the motor. The electrical control furthermore comprises a latching relay 240 and a releasing relay 241. One side of the latching relay 240 is connected by wire 242 to the switch arm 236 of the switch 235. The fixed contact 237 of the switch 235 is connected by wire 243 to one side of the power supply. The wire 243 is connected by wire 244 to switch arm 179 of switch 178, and to the switch arm 174 of switch 173.

One side of the coil 157 of the solenoid 156 is connected by wire 245 to the other side of the power supply. The other side of the latching relay 240 is connected by wire 246 to one side of the releasing relay 241. The other side of the releasing relay 241 is connected by wire 248 to the wire 246. The other side of the coil 157 of solenoid 156 is connected by wire 250 to the fixed contact 200. Switch arms 195 and 196 are connected by wire 252. Wire 250 is connected to wire 252 by wire 253. The cam 220 and cam 59 are so arranged that when the cam 59 passes the follower 58 to open the switch 173 cam part 221 passes the switch 173 so that both said switches open at the same time. When both the switches 173 and 178 are open the solenoid is deenergized and the motor feeds the belt. Cam part 223 furthermore will close the switch 173 while switch 178 is still open. Closure of the switch 173 will energize the solenoid. Thus when switch 178 closes, the solenoid 156 is energized through switch 196, 200, and switch 173. Switch 178 remains closed until both switches 173 and 178 again open to deenergize the solenoid.

However, when the seam passes rollers 101, 103, switch 235 closes and latching relay 240 becomes energized through said switch, thereby causing switch arm 194 to move into engagement with contact 198 to speed up the motor. At the same time switch 196, 200 opens so that even if switch 178 is thereafter closed the solenoid remains deenergized and the motor keeps advancing the belt quickly until the seam passes the wiping pad. In fact, the motor keeps advancing the belt quickly until switch 173 again closes, at which time the releasing relay 241 becomes energized through switch 194, 199 and said switch 173. The energization of the releasing relay 241 releases the relay 240 so that the switch arms 194, 195, and 196 move back to normal position.

If there are any defective parts of the belt,

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some thickness may be added to the belt in advance of the imperfection, so as to operate the switch 235 and cause the imperfect parts to pass the wiping pad.

A separate motor or any other suitable driving means may be employed for rotating the shaft 30. The advantages of the present machine will now be obvious. The drive for the belt is separate from the drive for the rest of the printing press. Means is provided to detect imperfections in the belt and to keep such imperfections or seams from stopping at the die wiping pad, so that the die will not wipe against seams or imperfections. Another advantage of the present arrangement is the use of a two speed motor so that when the belt is being advanced because of a seam or an imperfection, the belt will move faster during such time and allowing a lower normal speed of the belt which would result in less wear on the belt and less shock as power is engaged and disengaged and allowing the belt to remain for a longer period in the ink solvent.

Furthermore, with the present construction, if the die is of a certain width the portion of the belt which is wiped by the die would be substantially of the same length as the width of the die. If a greater length of belt were then advanced then a portion of the advanced belt would not be wiped and if such unwiped portion were considerable there would be a waste due to feeding lengths of belt which do not have any die wiping function. With the present arrangement the lengths of belt which have no wiping function is minimized.

Having thus described my invention I claim as new and desire to secure by Letters Patent:

1. In an intaglio printing press, a wiping pad, an endless belt in engagement with the pad, means to move the wiping pad against the belt and to retract the pad, a die, means to move the die against a portion of the belt which contacts the pad, means to ink the die, a common drive means for operating the pad moving and retracting means, the die moving means and the inking means, separate drive means for intermittently advancing the belt past the pad, and electrical switch actuated means controlled by said common drive means for synchronizing the advance of the belt with the movement of the pad, die and inking means.

2. In an intaglio printing press, a wiping pad, an endless belt in engagement with the pad, means to move the wiping pad against the belt and away from the belt, a die, means to move the die against a portion of the belt which contacts the pad, means to ink the die, a common drive means for operating the pad moving means, the die moving means and the inking means, and separate drive means for intermittently advancing the belt past the pad, electrical switch actuated means controlled by said common drive means for synchronizing the advance of the belt with the movement of the pad, die and inking means, and means to vary the length of advance of the belt each time it is advanced.

3. In an intaglio engraving press, a wiping pad, an endless die wiping belt passing beneath the wiping pad, means to move the wiping pad against an inner part of the belt and also to retract the pad, a die, means to move the die past the portion of the belt contacting the wiping pad when the wiping pad has been moved against the belt to wipe the face of the die, electrical switch actuated means to advance the belt each time the wiping pad is moved away from the belt, and

means to vary the length of travel of the wiping belt.

4. In an intaglio engraving press, a wiping pad, an endless belt, means to move the wiping pad against the inner side of the belt and also to retract the pad, a die, means to reciprocate the die relative to said wiping pad so that when said wiping pad has been moved against the belt, the die will advance and contact the portion of the belt engaging the wiping pad for wiping the face of the die, and as the wiping pad is retracted the die will continue moving, means to advance the belt, means controlled by the means for moving the wiping pad to initiate advance of the belt after the die has had wiping engagement with the belt, and upon retracting the wiping pad, and means to stop the advance of the belt prior to the succeeding wiping contact of the die by the belt.

5. In an intaglio engraving press, a wiping pad, an endless belt, means to move the wiping pad against the inner side of the belt and also to retract the pad, a die, means to reciprocate the die relative to said wiping pad so that when said wiping pad has been moved against the belt the die will advance and contact the portion of the belt engaging the wiping pad for wiping the face of the die, and as the wiping pad is retracted the die will continue moving, means to advance the belt, means controlled by the means for moving the wiping pad to initiate advance of the belt after the die has had wiping engagement with the belt, and upon retracting the wiping pad, means to stop the advance of the belt prior to the succeeding wiping contact of the die by the belt, and means to prevent movement of the belt until the die moves beyond wiping contact with the belt.

6. In an intaglio engraving press a wiping pad, an endless belt, means to move the wiping pad against the inner side of the belt and also to retract the pad, means to reciprocate a die relative to said wiping pad so that when said wiping pad has been moved against the belt, the die will advance and contact the portion of the belt engaging the wiping pad for wiping the face of the die, and as the wiping pad is retracted the die will continue moving, means to advance the belt, means controlled by the means for moving the wiping pad to initiate advance of the belt after the die has had wiping engagement with the belt, and upon retracting the wiping pad, means to stop the advance of the belt prior to the succeeding wiping contact of the die by the belt, and means controlled by the last means for increasing the speed of movement of the belt.

7. In an intaglio printing press, a wiping pad, an endless die wiping belt adapted to engage said pad, means to move the wiping pad toward and away from the belt, a pair of rollers through which said belt passes, a shaft on one of said rollers, an electric motor, clutch means interconnecting said motor and roller shaft, solenoid means controlling said clutch means, and means controlled by said wiping pad moving means to control the operation of said solenoid means.

8. In an intaglio printing press, a wiping pad, an endless die wiping belt adapted to engage said pad, means to move the wiping pad toward and away from the belt, a pair of rollers through which said belt passes, a shaft on one of said rollers, an electric motor, clutch means interconnecting said motor and roller shaft, solenoid means controlling said clutch means, means controlled by said wiping pad moving means to con-

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trol the operation of said solenoid means, and means controlled by said belt for controlling the operation of said solenoid.

9. In an intaglio printing press, a wiping pad, an endless die wiping belt adapted to engage said pad, means to move the wiping pad toward and away from the belt, a pair of rollers through which said belt passes, a shaft on one of said rollers, an electric motor, clutch means interconnecting said motor and roller shaft, solenoid means controlling said clutch means, means controlled by said wiping pad moving means to control the operation of said solenoid means, and means controlled by said belt for controlling the operation of said solenoid, said motor having two speeds and means controlled by said belt controlled means for changing the motor from one speed to another.

10. In an intaglio printing press, a wiping pad, an endless die wiping belt adapted to engage said pad, a pair of rollers through which said belt passes, a shaft on one of said rollers, an electric motor, clutch means interconnecting said motor and roller shaft, solenoid means controlling said clutch means, means to move the wiping pad relative to the belt, means controlled by said wiping pad moving means to control the operation of said solenoid means, a die, means to move the die, and means controlled by the die moving means to control the operation of said solenoid.

11. In an intaglio printing press, a wiping pad, an endless die wiping belt adapted to engage said pad, a pair of rollers through which said belt passes, a shaft on one of said rollers, an electric motor, clutch means interconnecting said motor and roller shaft, solenoid means controlling said clutch means, means to move the wiping pad relative to the belt, means controlled by said wiping pad moving means to control the operation of said solenoid means, a die, means to move the die, means controlled by the die moving means to control the operation of said solenoid, and means to vary the control of the solenoid by the die moving means.

12. In an intaglio engraving press, a die wiping pad, an endless die wiping belt, a die, means for moving the wiping pad relative to the belt against the inner side thereof, means for moving the die against the outer surface of the portion of the belt contacted by the wiping pad and therebeyond, a pair of rollers engaging opposite sides of the belt, an electric motor, clutch means interconnecting the motor and one of said rollers, means to declutch said clutch means, means controlled by a solenoid to operate said declutching means, means controlled by the means for moving the wiping pad to deenergize the solenoid to clutch said motor to said roller for advancing the belt, and means controlled by the means for moving the die to energize said solenoid for declutching said clutch means to stop the advance of the belt.

13. In an intaglio printing press, a wiping pad, an endless die wiping belt adapted to engage said pad, a pair of rollers through which said belt passes, a shaft on one of said rollers, an elec-

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tric motor, clutch means interconnecting said motor and roller shaft, solenoid means controlling said clutch means, means controlled by said wiping pad moving means to control the operation of said solenoid means, means controlled by said belt for controlling the operation of said solenoid, said motor having two speeds and means controlled by said belt controlled means for changing the motor from one speed to another, and means to vary the point in the movement of the die at which the solenoid is deenergized.

14. In an intaglio printing press, a wiping pad, an endless die wiping belt adapted to engage said pad, a pair of rollers through which said belt passes, a shaft on one of said rollers, an electric motor, clutch means interconnecting said motor and roller shaft, solenoid means controlling said clutch means, means controlled by said wiping pad moving means to control the operation of said solenoid means, means controlled by said belt for controlling the operation of said solenoid, said motor having two speeds and means controlled by said belt controlled means for changing the motor from one speed to another, means to vary the point in the movement of the die at which the solenoid is deenergized, and means controlled by the belt to prevent the energization of said solenoid by said die moving controlled means so that the belt keeps advancing.

15. In an intaglio printing press, a wiping pad, an endless die wiping belt adapted to engage said pad, a pair of rollers through which said belt passes, a shaft on one of said rollers, an electric motor, clutch means interconnecting said motor and roller shaft, solenoid means controlling said clutch means, means controlled by said wiping pad moving means to control the operation of said solenoid means, means controlled by said belt for controlling the operation of said solenoid, said motor having two speeds and means controlled by said belt controlled means for changing the motor from one speed to another, means to vary the point in the movement of the die at which the solenoid is deenergized, means controlled by the belt to prevent the energization of said solenoid by said die moving controlled means so that the belt keeps advancing, and means operated by the means controlled by the means for moving the wiping pad to render said belt controlled means inoperative.

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