This invention relates to intaglio engraving presses such as die-stamping presses having means to feed an endless belt for wiping the engraving die. According to the invention disclosed in my prior U.S. Patent No. 2,853,942, regular increments of movement of the belt is accomplished through mechanical means operating by the press motor, and a separate higher speed motor is provided for operating the belt through an extra long feeding increment to prevent the seizure of the belt and thereby prevent the spoilage of one or more imprints.

An object of the present invention is to provide improved means, operated by the press motor, for moving the die wiping belt through an extra long feeding increment as the seam of the belt approaches the die.

A further object is to provide, in apparatus of the type described, die wiping belt moving means, including a magnetic clutch which, when energized, is driven by the operating motor of the press, and drives the operating mechanism of the belt in a manner which moves the belt through an extra long feeding increment and thereby avoids wiping of the seam of the belt against the die.

Another object is to provide, in a press having the above described mechanism for extra long feeding increments of the belt, safety means to prevent energizing of the magnetic clutch in the event that the press stops at the moment the seam of the belt is at the position of the seam sensing switch.

A further object is to provide, in apparatus of the character described, means to permit the operator to energize the magnetic clutch to move the belt continuously for the purpose of cleaning the belt when the main operating parts of the press are disengaged but the press drive motor is operating.

Another object is to provide, in a press of the character described, motor operated means for operating the press and moving the belt through predetermined increments, and means depending on the seam passing a predetermined point in its movement for causing the belt to be moved by means of an electromagnetic clutch driven by the press drive motor, during a predetermined cycle in the operation of the press, and then to de-energize the clutch drive of the belt so that the latter continues being moved through regular short increments by operation of the press.

A further object is to provide means to move the seam portion of the belt in predetermined extra long increments, so that the distance traveled by the belt is always the same amount, notwithstanding that the press may operate at different speeds.

Another object is to provide means to move the seam portion of the belt at speeds in proportion to the operating speed of the press and thereby reduce wear and abrasion on the tensioned portion of the belt over which that occurred heretofore. Another object of the invention is to provide a strong, rugged and durable press 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 the invention will be apparent in the following claims.

The invention accordingly consists in the features of construction, combinations of elements, and arrangement of parts, 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 an illustrative embodiment of this invention:

FIG. 1 is a side elevational view of an intaglio engraving press embodying the invention;

FIG. 2 is a rear elevational view of the press;

FIG. 3 is a vertical sectional view taken on line 3--3 of FIG. 2 and illustrating the belt cleaning devices in more or less diagrammatic form;

FIG. 4 is a side elevational view illustrating the belt wringer rollers and part of the drive therefor;

FIG. 5 is a side view of the seam portion of the die wiping belt; and

FIG. 6 is a wiring diagram illustrating the electrical controls for the press.

Referring now to the drawings in detail, the press 10 comprises a drive motor 12 which operates, via pulley belt 13, a variable speed Reeves drive 14 whose drive shaft is indicated at 16. The motor and Reeves drive are suitably mounted as a unit on platform 18 of the frame of the press. A double pulley 20 is fixed to shaft 16 and drives a flywheel 22 through belts 24. Flywheel 22 is fixed to a rotary shaft 26 that is suitably journaled to the frame of the press. An idler roller 28 (FIG. 1) is suitably supported against belts 24 for maintaining the latter under tension. Shaft 26 is the main drive shaft of the press and is connected to drive shaft 26c through a clutch 27, as will be explained more in detail hereinafter.

As best seen in FIG. 3, a pinion gear 30 is fixed to shaft 26c and meshes with spur gears 32 and 34. Gear 32 is fixed to a rotary shaft 36 that is journaled in a pedestal bearing 38 mounted on the base 40 of the press. A rotary driver disk 42 is fixed to shaft 36 and has a driver roller 44 which extends into an S-shaped cam slot 46 provided in a follower link 48 which is pivoted at its lower end 50 to base 40. The lower end of link 52 is pivoted at 54 to the upper end of link 48 and an engraving die 56 is connected to the upper end of link 52 and slides horizontally, back and forth, in guides provided in horizontal frame portion 58.

Gear 34 is fixed to a rotary shaft 60 which is suitably journaled in parts of the frame of the press. A rotary disk 62 is fixed to shaft 60 and the lower end of a link 64 is eccentrically and pivotally connected to disk 62, as at 66. The upper end of link 64 is pivotally connected at 68 to the upper end of a ram 70 which is mounted for vertical up and down movement in vertical guides (not shown), provided in parts of the frame of the press.

Slidably mounted on the machine in any suitable manner for vertical up and down movement between suitable vertical guides (not shown) is a wiping pad 72. Movement of the pad is caused by a rotary cam 74 which is fixed to shaft 60 and drives a follower roller 76 that is mounted for rotation on the lower end of a bell crank 78. The bell crank is pivoted to a part of the frame of the press and the opposite end of the bell crank is connected, by a pin and slot connection 82 to a member 84 that extends upwardly from pad 72. A tension spring 86 maintains follower 76 in contact with cam 74. Rotation of the cam causes up and down movement of pad 72, in synchronization with the movement of the die. A wiping ink 88, containing ink, is mounted on horizontal frame part 58 and an ink roller 90 is mounted in the trough with the upper part of the roller above the upper edge of the trough. A transfer roller 92 is mounted to the lower end thereof 94 whose opposite end is pivotally connected at 96 to the frame part 98 of the press. Arm 94 oscillates between
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the ink receiving position illustrated by FIG. 3, in which roller 92 is in contact with roller 90 to receive ink therefrom, and an ink applying position wherein roller 92 is in a down position against the top face of die 56 as the latter moves downward into ink receiving position, as viewed in FIG. 3. Roller 90 is in contact with a roller 91 which is immersed in the ink in trough 88 for transferring ink from the trough to roller 90. The operating mechanism for the ink rollers will be described hereinafter. The mechanism for operating arm 94 is identical to that illustrated and described in my prior U.S. Patent No. 2,853,942 and need not again be described or illustrated here.

An endless die wiping belt 100 extends below pad 72 and the latter is provided with a roller 102 for assisting in the movement of the belt over the pad. From the above description, it is to be understood that when pad 72 comes down, die 56 moves to the right, as viewed in FIG. 3, against the portion of the belt which contacts the pad, and the surface of the die is wiped 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 70 comes down and causes the printing operation. When die 56 passes the portion of the belt in contact with pad 72, the belt is stationary and does not move. The drive for the belt and its path through the press (as illustrated by FIG. 3) will now be considered in detail.

Belt 100 passes downwardly through a pair of front feed rollers 104 and 106, and past a pair of seam sensing rollers 108 and 110 which are positioned at opposite sides of the belt. Roller 108 is attached to the lower end of a stationary arm 112 which is secured to frame part 114 of the press. Roller 110 is connected to the lower end of a movable switch actuating arm 116 which is pivotally connected at its upper end to frame part 114. Arm 116 operates a double thickness sensing switch 118 for reasons which will be more clearly understood hereinafter. Switch 118 is suitably mounted on frame part 114.

Belt 100 extends downwardly past switch 118, around pad roller 102 and around wiping pad 72, then upward to a first ink scraper 120 suitably mounted to a part of the frame of the press. At this scraper most of the ink is recovered from the belt and drops onto a pan 122 suitably secured to a part of the frame of the press, and from which it flows back to trough 88. The belt then passes upwardly over a first moistening roller 124 which is constantly wet with a suitable solvent in trough 126. The trough is supplied with solvent from a reservoir (not shown) which maintains a constant level of solvent at a height sufficient to wet the lower part of roller 124. After receiving a layer of solvent from first moistening roller 124, the belt passes over a second scraper 128 which removes more ink, and the mixture of ink and solvent drips down onto a tray 130 and from the latter to receptacle 131. This dilute ink may be used as required to thin the ink in the fountain to desired viscosity.

From scraper 128, the belt passes over a second moistening roller 124 immersed in a trough 126 containing solvent. The belt then passes downwardly into a trough 132 containing solvent, around a roller 133 in the trough, then up between scrapers 134 and 136 which are positioned at opposite sides of the belt and remove the remnants of the ink and solvent which fall down into trough 132. The belt is now clean enough for reuse. The belt then passes upwardly through wringer rollers 138 and 140 and then over or around a series of rollers 142a, 142b, 142c, 142d, 142e, 142f, 142g, 142h, 142l and 142k for air drying of the belt to condition the latter for a repetition of the cycle. The belt then passes to the front of the press, over idler roller 144.

Means are 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 lowest position. For this purpose, a disk 146 is fixed to shaft 36 and the lower end of a reach rod 148 is pivotally and eccentrically connected to the disk at 150. The upper end of the reach rod is pivotally connected to one end of a link 152 which is fixed to the rotary input end of a suitable overriding clutch 156 (FIG. 2). The output end of the clutch is connected to a rotary shaft 158 suitably journaled in bearings 160. Clutch 156 is operable to drive shaft 158 in one direction upon movement of link 152 in a corresponding direction but will not operate the shaft when the link is moved in an opposite direction. Such a clutch may be obtained from the Frisprom Co. of New York, Michigan, U.S.A. and is identified by their model No. FS8-1,000.

A gear 162 (FIGS. 2 and 4) is fixed to one end of shaft 158 and is in mesh with a gear 164 which is fixed to one end of wringer roller 140. The companion end of wringer roller 138 is provided with a gear 166 which is in mesh with gear 164 so that the rollers are driven in opposite directions with belt 100 squeezed therebetween.

A sprocket wheel 168 is fixed to shaft 158 and is connected by a sprocket chain 170 to a sprocket wheel 172 (FIG. 3) which is fixed to a rotary shaft 174 to which front feed roller 106 is fixed. Small front feed roller 104 idles under spring pressure against the belt to maintain a frictional grip on the belt.

Gear 162 has fifty-four teeth and gear 164 has thirty-four teeth as does gear 166. Sprocket wheel 168 has twenty-eight teeth and sprocket wheel 172 has twenty-seven teeth. The wringer rollers 138 and 140 are each 2¾” in diameter and large front feed roller 106 is 3” in diameter. A study of the gear and sprocket ratios involved will disclose that the peripheral driving movement of the wringer rollers tends to advance the belt slightly more than the front feed rollers 104 and 106 feed the belt. This advantage in belt feed of the wringer rollers over the front feed rollers is in the ratio of approximately .4 inch to one foot. Thus the section of the belt from the front feed rollers, down and past the wiping pad, scrapers and cleaning mechanism and thence up through the wringer rollers is maintained under considerable tension.

The ends of the wringer rollers are journaled in square journal boxes whose positions may be adjusted back and forth by thumbscrew 176 to vary the gripping pressure of the wringer rollers on the belt, as fully illustrated in my prior U.S. Patent No. 2,853,942. By increasing or decreasing pressure, the frictional driving efficiency of the wringer rollers may be varied to obtain a greater or lesser tension in the belt to control good operation.

As indicated previously, means is provided for moving the belt through an extra long feeding increment as the seam 178 (FIG. 5) of the belt approaches the die so that the seam does not contact the die 56. As best seen in FIGS. 1 and 2, a sprocket wheel 180 is fixed to and is connected to a sprocket wheel 182 by a sprocket chain 184. Sprocket wheel 182 is fixed to a rotary fountain drive shaft 186 which is suitably journaled in bearings in parts of the frame of the press. A sprocket wheel 188 is fixed to shaft 186 and drives a sprocket wheel 190 through a sprocket chain 192. Sprocket wheel 190 is fixed to a rotary shaft 194 which is suitably journaled in bearings on the frame parts 196 of the press. A sprocket wheel 198 is fixed to shaft 194 and drives a sprocket wheel 200 through a sprocket chain 202. Sprocket wheel 200 is mounted on the input end of an electro-magnetic clutch 204 which is fixed to a rotary shaft 206 that is suitably journaled in bearings on the frame part 196. A suitable clutch is one manufactured by The Carlyle Johnson Machine Co. of Manchester, Connecticut and identified by them as their 9000 series. Shaft 206 is in axial alignment with shaft 208 and is connected thereto by a coupling 210. Shaft 208 is connected to the input end of clutch 156. With the magnetic clutch de-energized, and motor 12 energized, sprocket wheel 200 rotates but shaft 208 does not. When the magnetic clutch energized, shaft 208 rotates and operates shaft 158 through clutch 156 and operates wringer rollers 138 and 140 at a higher speed than normally to
quickly move the seamed portion of the belt past the die without contacting the latter. The rotation of shaft 208 overrides the intermittent crank action transmitted from link 152 as both drives are in the same direction. Sprocket wheels 180 and 182 each have twenty-four teeth. Sprocket wheel 188 has sixteen teeth and sprocket wheel 190 has thirty-six teeth. Sprocket wheel 198 has eighteen teeth and sprocket wheel 200 has forty teeth.

Shaft 26a is operatedly connected to drive shaft 26 through clutch 27, as mentioned previously. Clutch driven part 214 is mounted on shaft 26a and is adapted to be engaged by driver part 216 which is drivenly mounted on shaft 26 and is operated by a handle 218 which is pivoted at 220. The handle is connected to driver part 216 by a link 222. A safety switch 219 is placed in the path of movement of handle 218 and its contacts are closed, as will be more clearly seen hereinafter, when the clutch parts are engaged for normal operation of the press.

During normal operation of the press, with the clutch parts engaged, the belt is moved in normal increments to clean the die and when the seamed portion approaches the die, shaft 158 is operated at higher speeds due to the energization of the magnetic clutch 204 to move the seamed portion past the die without contacting the latter. The belt may be moved at high speeds for cleaning or for other purposes without operating the other part of the press, by disengaging clutch parts 214 and 216 and energizing the magnetic clutch. The automatic operation of the press will now be described in detail with respect to FIG. 6.

A timer switch 224 is suitably mounted in the path of movement of follower roller 76 of cam 74 for operation by the latter, and cam 74 will be referred to as a timer cam. It will be noted that the cam has a high portion 74a and a low portion 74b which extends throughout a major arc of about 260° of the cam. The arrangement is such that movable switch arm 224a of switch 224 is actuated by the high portion 74a of the cam when the wiping pad presses against the belt as shown in FIG. 3. With the timer cam 74 in low dwell position as shown in FIG. 6, and assuming that the double thickness switch 118 is actuated by the belt seam portion 178 passing between feeler rollers 108 and 110, then movable contact 118c of switch 118 contacts stationary contact 118b and completes a circuit to the latch coil of the latching relay R1 via leads 226, 228, 230, now closed contacts 118a and 118b and lead 232. Power for the circuit is obtained from a step-down transformer 234 whose primary 234a is connected to a suitable source of 110 volts A.C. via power leads P1 and P2. Energization of relay R1 causes its contacts C-1 to close. Latching relay R1 remains mechanically latched once it has been energized until it is reset electrically as described later (by energization of relay LR1). At this time, the switch arm 224a is in contact with stationary contact 224b of timer switch 224. Nothing happens until the raised section 74a of cam 74 moves switch arm 224a into contact with stationary contact 224c permitting current to flow through now closed contacts C-1, via lead 236, to energize relay R3 and close contacts C-2 and C-3. Contacts C-2 maintain relay R2 electrically latched.

Nothing else happens, and this condition prevails, until the cam 74 moves so that movable contact 224a again engages stationary contact 224b, the normal position of switch 224. Current then flows through contacts 224a and 224b and through contacts C-3, safety switch 219, which is closed during normal operation of the press, and the coil of relay R3 thereby energizing the latter and closing contacts C-4 and C-5. If the safety switch 219 is not closed, then relay R3 is not energized and the circuit remains open.

Upon closing of contacts C-4 and C-5, the following happens: closing of contacts C-5 energizes power relay R4, via leads 238 and 240, thus closing contacts C-6 and C-7 which are in parallel for extra capacity on the 100 volt D.C. side of rectifier 242. The rectifier has a 110 volt A.C. input and a 100 volt D.C. output. Closing of contacts C-6 and C-7 connects the electromagnetic coil 244 of magnetic clutch 204 to the D.C. output. Contact 242, via leads 245 and 246, to drive belt 100. A resistor 247 and a condenser 248 are connected in series with each other across coil 244.

Simultaneously, latching relay R1 is reset because of energization of the reset relay LR1 which became energized upon closing of contacts C-4 via lead 250. Contacts C-1 open and relay R2 is a de-energized so contacts C-2 and C-3 open. Cam 74 continues to rotate until its raised part 74a moves contact 224a into engagement with contact 224b which results in the de-energization of relay R3 so contacts C-4 and C-5 open. Opening of contact C-5 de-energizes the reset coil LR1 of relay R1, and the power relay R4, thereby opening contacts C-6 and C-7 and de-energizing the magnetic clutch so that the drive of the belt is released. All the relays are now back in normal position.

Safety switch 219 is provided so that when the press is declutched and cam 74 is not moving, magnetic clutch 204 will not respond to the double thickness seam switch 118 in the event the press happens to be stopped at the moment that the seam portion 178 was at the feelers 108 and 110 of the switch.

The inching switch 252 (FIG. 6) is normally open so that when the press is stopped but drive motor 12 is idling, the operator may use magnetic clutch 204 to move the belt through the press continuously for the purpose of cleaning the belt. The inching switch may comprise an ordinary push button switch fastened to the front of the press at a location convenient to the operator. If cam 74 is positioned so that contact 224a of the timer switch contacts contact 224b, operation of push button 252 results in the energization of the magnetic clutch and belt 100 is moved continuously until the push button is released.

As best seen in FIGS. 2 and 3, a sprocket wheel 254 is fixed to shaft 186 and drives a sprocket wheel 256 through sprocket chain 258 which is fixed to a rotary shaft 260 on which ink roller 91 is fixedly mounted. A gear 262 is fixed to shaft 260 and meshes with a gear 264 that is fixed to rotary shaft 266 on which ink roller 90 is fixedly mounted. Thus it is seen that roller 91 rotates in ink trough 88 and roller 90 rotates also in contact with roller 91 to transfer ink to roller 92.

From the above description of the invention, it will be understood that the long belt movement for passing the seam portion is always the same length regardless of the speed of the press. Presses heretofore provided with variable speed drives are often run at slow speeds. Where a separate motor operating at a constant speed was provided to pass the seam portion of the belt, then as the press speed slowed down, the amount of movement of the seam portion increased. According to the present invention, this excess movement is avoided as all the parts of the press are driven by one motor. As the press speed is lowered, the velocity of the moving seam portion is lowered. This allows more efficient ink recovery and cleaning and avoids excessive wear on the belt due to excessive high velocities. Also, shocks to the belt upon starting are reduced. The single drive motor of the press eliminates a bulky, separate motor, in a cumbersome location for passing the seam portion of the belt. The ink recovery system described herein enables a large portion of ink to be removed from the belt and returned to the fountain in dilution. Subsequent moistening with solvent and scraping removes a minor portion of ink which is not returned directly to the fountain but may be reused as required for customary thinning of fountain ink.

It will thus be seen that there is provided an apparatus in which the several objects of this invention are achieved.
and which is well adapted to meet the condition of practical use. As possible embodiments might be made of the above invention, and as various changes might be made in the embodiment above set forth, it is to be understood that all modifications herein set forth or shown in the accompanying drawings are to be interpreted as illustrative and not in a limiting sense.

1. In an intaglio engraving printing press, a die, an endless die wiping belt mounted for movement in the direction of its length, movable means in contact with said belt for moving the latter, a motor, first means operatively connected to said belt moving means and said motor and operated by the latter for operating said belt moving means intermittently, to thereby move said belt intermittently for a predetermined distance during each intermittent movement, means controlled by said motor to move said die for wiping operations of said die by said belt, and second means operatively connected to said belt moving means and said motor and operated by the latter for operating said belt moving means to thereby move said belt through a predetermined distance which is greater than said first mentioned predetermined distance irrespective of the speed of the movement of said die, said belt having a seam portion, and means responsive to the position of said seam portion for controlling operation of said second means.

2. In an intaglio engraving printing press as defined in claim 1, said belt moving means comprising a pair of rollers at opposite sides of said belt and in contact with the companion sides of said belt, said first means comprising a rotary shaft, gear means operatively connecting said rotary shaft to said rollers, means on said shaft for rotating the latter in one direction only, and means operatively connected to said shaft for rotating means and movable back and forth for operating said shaft rotating means to rotate said shaft intermittently in one direction only.

3. In an intaglio engraving printing press as defined in claim 2, said shaft rotating means comprising an over-riding clutch.

4. In an intaglio engraving printing press as defined in claim 2, said second means comprising a second rotary shaft operatively connected to said shaft rotating means, electrically operated means connected to said second shaft for operating the latter when said electrically operated means are electrically energized, and means operatively interconnecting said electrically operated means to said motor.

5. In an intaglio engraving printing press as defined in claim 4, said electrically operated means comprising an electro-magnetic clutch.

6. In an intaglio engraving printing press, intaglio printing mechanism, an endless die wiping belt mounted for movement in the direction of its length, a pair of rollers at opposite sides of said belt in contact with the companion sides of said belt for moving the latter, a first rotary shaft operatively connected to said rollers for rotating the latter, an overriding shaft mounted on said shaft and operable to rotate said shaft in one direction only, said motor, means driven by said motor to operate said mechanism, means operatively connected to said clutch and said motor and operated by the latter for intermittently operating said first shaft, to move said belt through a first predetermined distance during each intermittent operation of said first shaft, a second rotary shaft operatively connected to said clutch for operating the latter, an electro-magnetic clutch mounted on said second shaft for operating the latter when said electro-magnetic clutch is energized to move said belt through a second predetermined distance which is greater than said first predetermined distance irrespective of the speed of the movement of said mechanism while said belt is being moved through said second predetermined distance, means operatively interconnecting said electro-magnetic clutch and said motor for operation of said electro-magnetic clutch by said motor, said belt having a seam portion, and control means responsive to the position of said seam portion for energizing said electro-magnetic clutch to thereby operate said first shaft and move said belt through said second predetermined distance.

7. In an intaglio engraving printing press as defined in claim 6, said control means comprising a seam switch positioned to be closed by said belt when said seam portion reaches said switch, a latching relay in series with said switch and adapted to be energized and latched in energized condition when said switch is closed by said seam portion, a switch adapted to close when said relay is energized, a second relay in series with said switch controlled by said latching relay, a control cam operated by said motor and having a high portion and a low portion, a control switch operated by said cam and having a normally closed section when the low portion of said cam engages said switch and having a normally open section adapted to be closed when the high portion of said cam engages said switch, a ram, a die, a wiping pad, means operatively interconnecting said motor, said ram, said die and said wiping pad for moving said ram, die and pad in synchronization, said die, pad and belt being positioned relative to each other for pressing of successive portions of said belt against said die by said die and said wiping pad between intermittent movements of said belt, the arrangement of said control cam and control switch being such that the high portion of the cam closes the normally open section of the control switch when the wiping pad presses against said belt, the normally open section of said control switch being in series with the contacts controlled by said latch relay, a pair of switches controlled by the second relay, one of said pair of switches being in series with the switch controlled by said latching relay, the second of said pair of switches being in series with the normally closed section of said control switch, a third relay in series with said second one of said pair of switches, a pair of switches controlled by said third relay, the first one of said pair of switches controlled by said third relay being in series with said third relay and with the normally closed section of said control switch, a fourth relay in series with said second one of said pair of switches, a second pair of switches controlled by said fourth relay for closing the circuit to said electro-magnetic clutch.

8. In an intaglio engraving printing press as defined in claim 7, and a fifth relay adapted to un latch said latching relay when said fifth relay is closed by said second pair of switches controlled by said third relay when said said fifth relay is closed by said said second pair of switches controlled by said third relay being in series with said fifth relay.

9. In an intaglio engraving printing press as defined in claim 6, and a second pair of rollers, spaced from said first pair of rollers, and being at opposite sides of said belt in contact with the companion side of said belt for moving the latter, and drive means operatively interconnecting said first rotary shaft and said second pair of rollers for operation of the latter by rotation of said first rotary shaft, said drive means including means to operate said second pair of rollers at a slower peripheral speed than said first mentioned pair of rollers for tensioning said belt.

10. In an intaglio engraving printing press, a motor, a first rotary shaft operatively connected to said motor for operation by the latter, a second rotary shaft in axial alignment with said first shaft, clutch means mounted on said first and second shafts for operating said first and second shafts to each other for operation of said second shaft by said first shaft, a pair of rollers for moving a die wiping belt in the direction of its length, means operatively interconnecting said rollers and said second shaft for rotating said rollers intermittently in one direction only, a third rotary shaft operatively connected to a last mentioned means, an electro-magnetic clutch mounted on said third rotary shaft for operating the latter
when said electro-magnetic clutch is energized, and means operatively connecting said first shaft to said electro-magnetic clutch for operation of the latter to move said rollers a predetermined distance irrespective of the speed of said motor.

11. In an intaglio engraving printing press as defined in claim 10, said means operatively interconnecting said rollers and said second shaft comprising a rotary member fixed to said second shaft, a link pivotally connected at one of its ends to said rotary member at a position eccentric of the longitudinal axis of said second shaft, a fourth rotary shaft, gear means interconnecting said fourth shaft and said rollers, an overriding clutch mounted on said fourth shaft for operating the latter, a second link connected at one of its ends to the input end of said clutch and pivotally connected at its opposite end to the other end of the first link.

12. In an intaglio engraving printing press as defined in claim 11, third shaft being connected to said input end of said overriding clutch, and control means operable in response to the position of said belt for energizing said electro-magnetic clutch and thereby driving said rollers through said overriding clutch.

13. In an intaglio engraving printing press as defined in claim 12, a ram, a die, a wiping pad, means driven by said second shaft to move said ram, die and pad in synchronization, the die wiping belt being endless and positioned for movement between said rollers and having a seam portion, said control means comprising a seam switch positioned to be closed by said belt when said seam portion reaches said switch, a latching relay is in series with said switch and is adapted to be energized and latched in energized condition when said switch is closed by said seam portion, a switch adapted to be closed when said relay is energized, a second relay in series with said switch controlled by said latching relay, a control cam operated by said motor and having a high portion and a low portion, a control switch operated by said cam and having a normally closed section when the low portion of said cam engages said switch and having a normally open section adapted to be closed when the high portion of said cam engages said switch, the normally open section of said control switch being in series with the contacts controlled by said latch relay, a pair of switches controlled by the second relay, one of said pair of switches being in series with the control switch controlled by said latching relay, the second of said pair of switches being in series with the normally closed section of said control switch, a third relay in series with said second one of said pair of switches, a pair of switches controlled by said third relay, the first one of said pair of switches controlled by said second relay being in series with said third relay and with the normally closed section of said control switch, a fourth relay in series with said second one of said pair of switches of said third relay, and switch means controlled by said fourth relay for closing the circuit to said electro-magnetic clutch.

14. In an intaglio printing press as defined in claim 13, and a fifth relay adapted to unlatch said latching relay when said fifth relay is energized, the second one of said pair of switches controlled by said third relay being in series with said fifth relay.

15. In an intaglio engraving printing press as defined in claim 14, and another switch controlled by operation of said clutch for interconnecting said first and second shafts and interposed between the third relay and the second one of the pair of switches controlled by the second relay.

16. In an intaglio engraving printing press as defined in claim 15, and conducting means interposed between the third relay and the closed section of the control switch, and a manual switch interposed in said conducting means.

17. In an intaglio printing press, intaglio printing mechanism, an endless wiping belt, a motor, means controlled by said motor to drive said mechanism, a shaft, a first means driven by said motor to move said shaft, means controlled by said shaft to move said belt, a second means driven by said motor to move said shaft a predetermined angle irrespective of the speed of said mechanism while said second means drives said shaft, and means on said belt to control the operation of said second means.

18. The combination of claim 17, said first means including a clutch, said second means including a clutch, and said second means including means to move said shaft at a rate of speed faster than the rate of speed of the first means.

19. The combination of claim 17, said first means including an intermittent drive for said shaft, and including an overriding clutch, said second means including a magnetic clutch, and said means on said belt which controls the operation of said second means including means to control the operation of said magnetic clutch.

20. The combination of claim 17, and means to vary the speed of said mechanism drive means.

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