

May 27, 1952

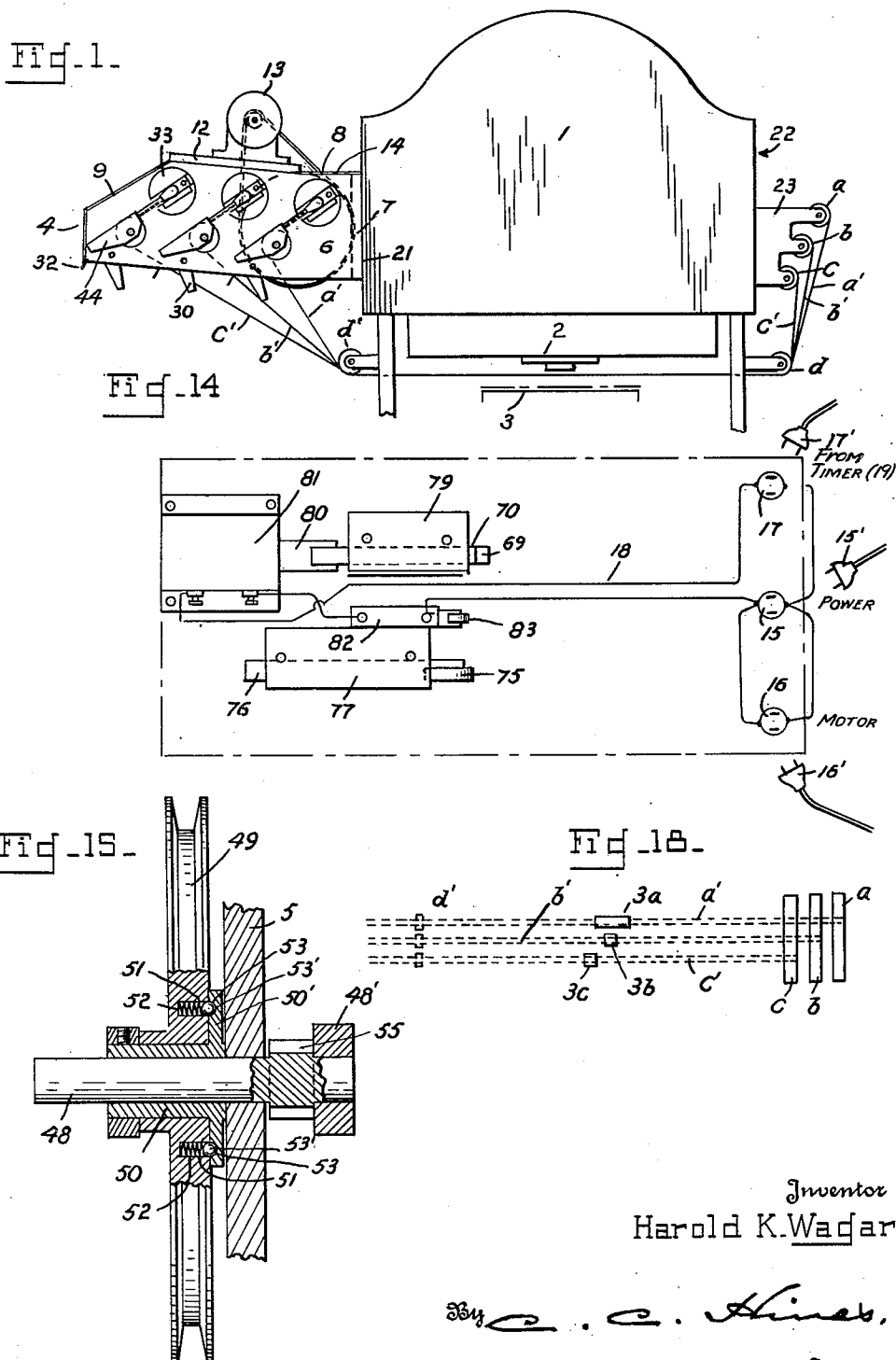
H. K. WAGAR

2,598,323

FOIL FEEDER FOR PRINTING OR EMBOSSING MACHINES

Filed Jan. 13, 1947

5 Sheets-Sheet 1



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May 27, 1952

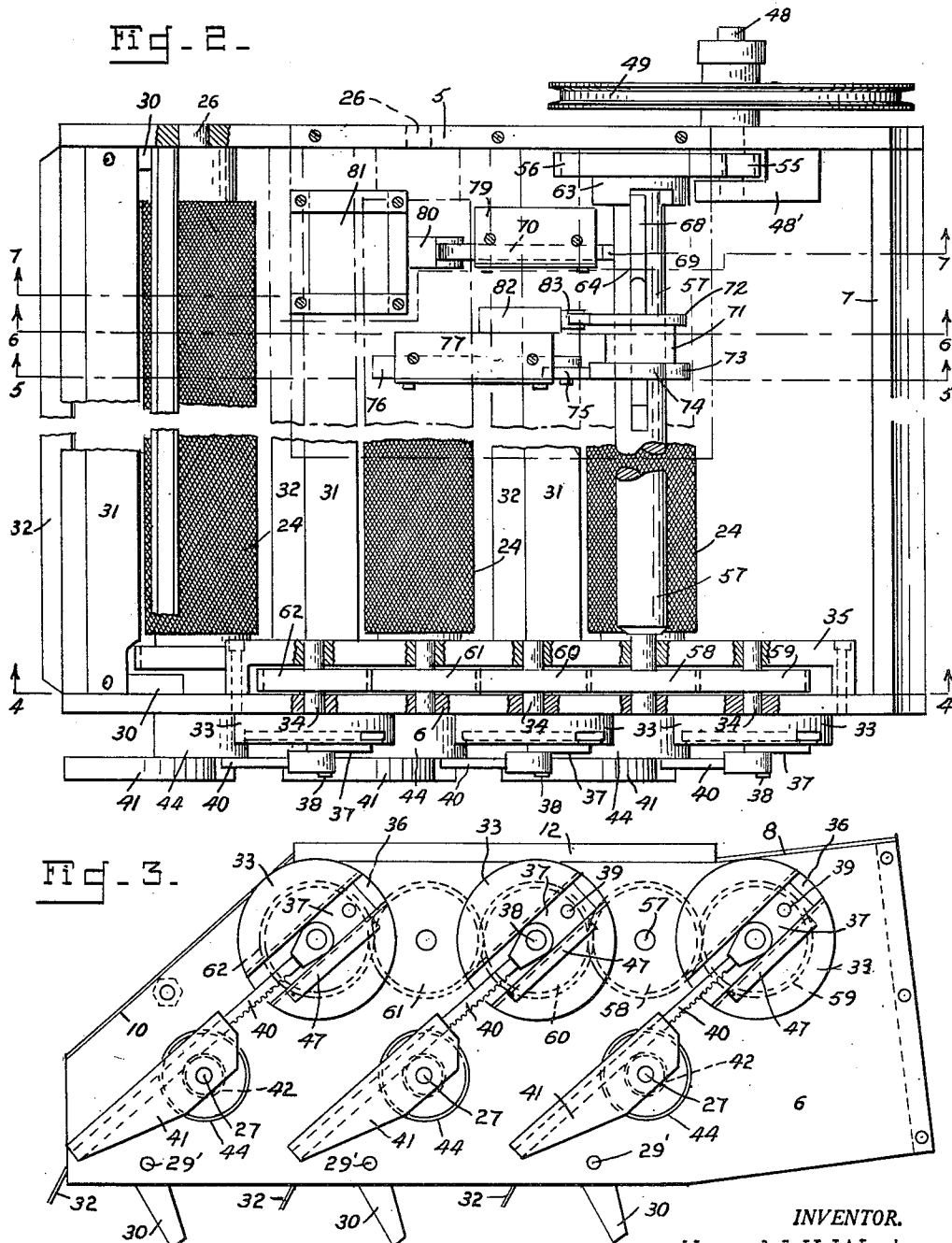
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FOIL FEEDER FOR PRINTING OR EMBOSING MACHINES

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5 Sheets-Sheet 2



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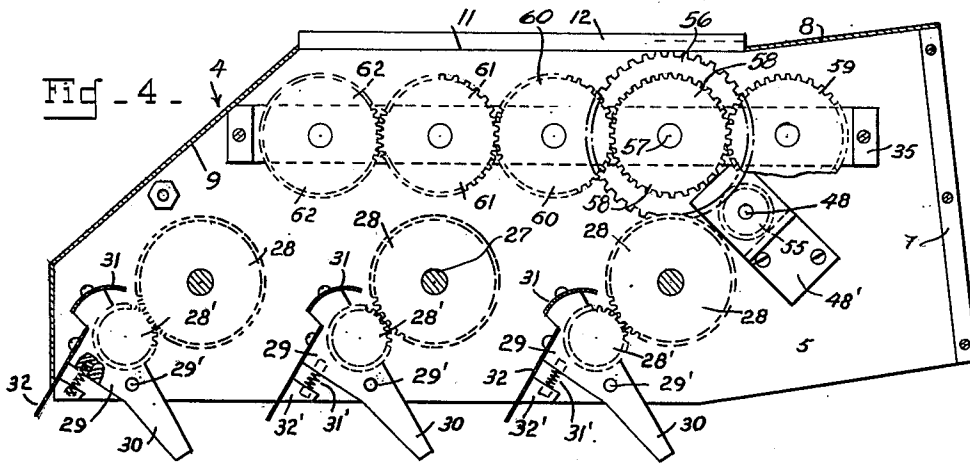
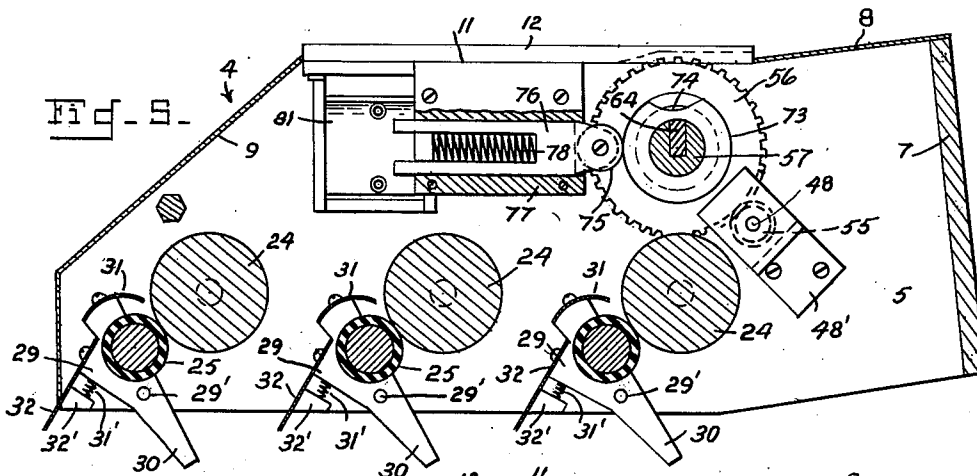
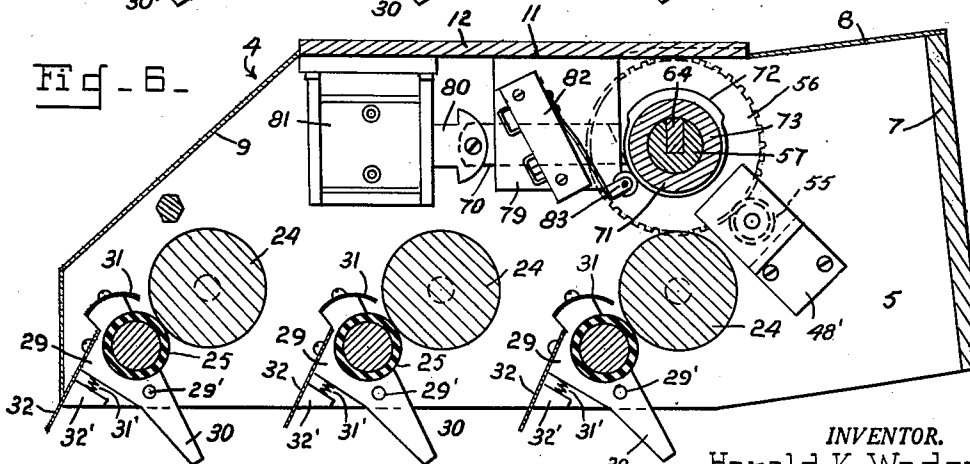
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FOIL FEEDER FOR PRINTING OR EMBOSSING MACHINES

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5 Sheets-Sheet 4

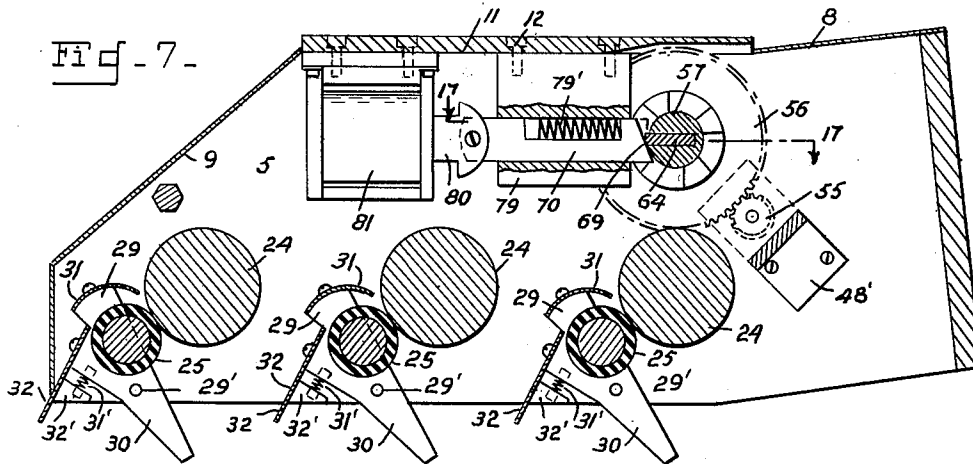
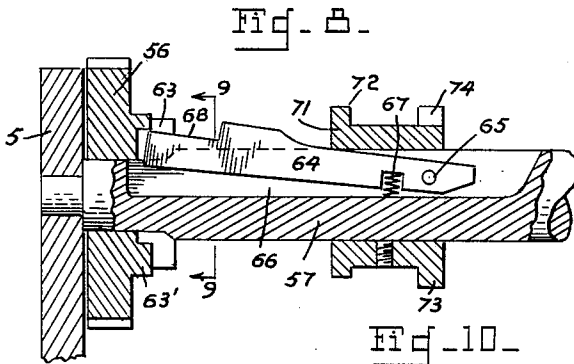
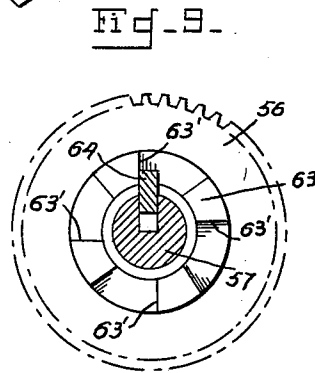
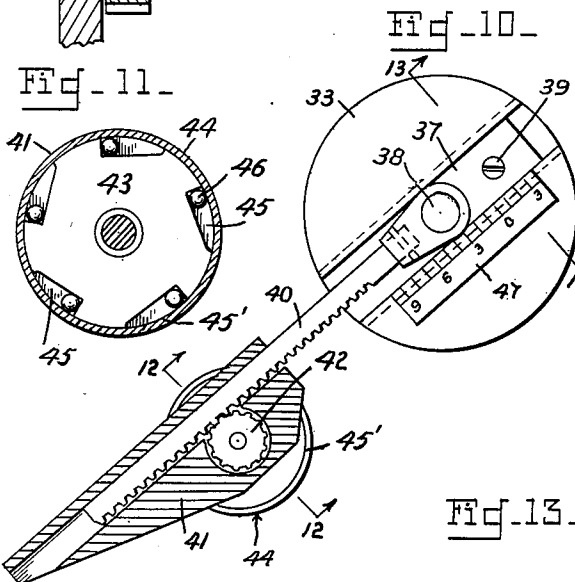
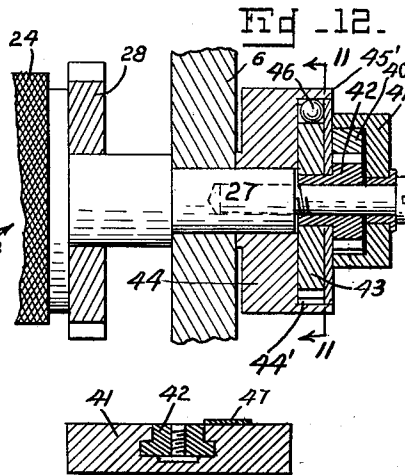


Fig. 13.

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Fig. 16.

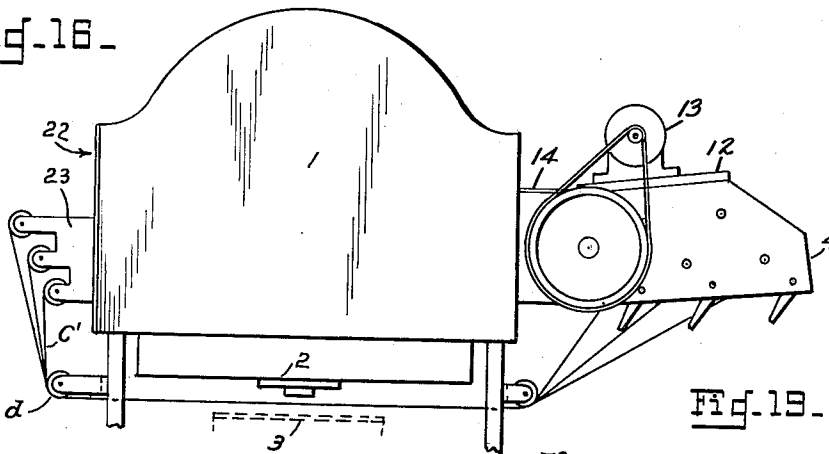


Fig. 19.

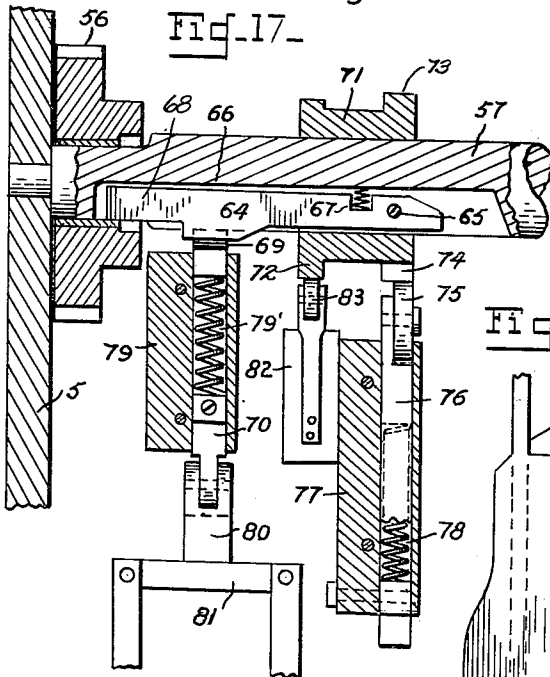
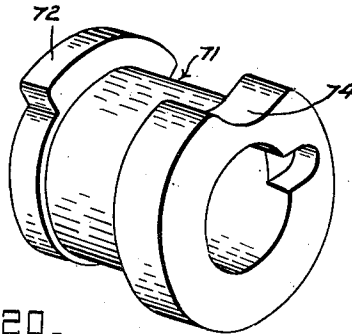
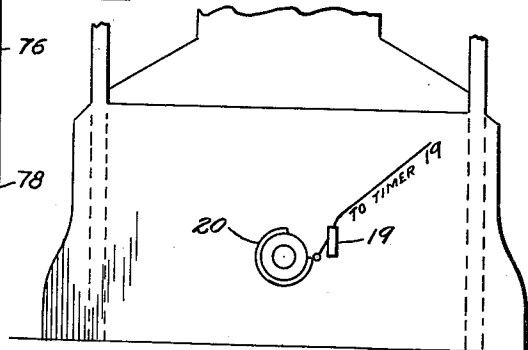


Fig. 20.



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UNITED STATES PATENT OFFICE

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FOIL FEEDER FOR PRINTING OR
EMBOSSING MACHINES

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Application January 13, 1947, Serial No. 721,742

12 Claims. (Cl. 271-2.4)

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This invention relates to foil feeders for stamping or printing machines of that type in which one or more gold, silver or other foil strips, tapes or sheets carrying the foil metal are fed up in the operation of the machine to a position or positions for coaction with a printing or stamping die or dies by means of which the foil material is impressed and applied to a book cover or other article or surface to be printed or embossed with the subject matter represented by the die or dies.

One object of the invention is to provide a feeder whereby one or more foil strips may be simultaneously and accurately and quickly fed to printing or stamping position so that greater production may be obtained than is possible with other machines in use.

Another object of the invention is to provide a feeder whereby any strip may be accurately fed a given distance to the printing point and whereby a plurality of strips may be accurately and simultaneously fed the same or different distances to the printing point or points in such manner that a great saving in foil may be effected.

Still another object of the invention is to provide a feeder in which the foil feed device or devices may be readily and quickly adjusted independently of each other to vary their throw and the feeding ranges as circumstances may require.

Still another object of the invention is to provide a feeder which will securely engage and feed the foil without allowing slack or clogging liable to cause breakage of the foil or to otherwise interfere with the operation of the machine.

Still another object of the invention is to provide a feeder having one or more sets of foil feed rolls, each preferably comprising a knurled metal driving roll and a rubber surfaced roll driven thereby, together with deflecting and guiding means for positively deflecting the foil away from the metal roll as it emerges from between the gripping surfaces of the rolls and guiding it properly over the rubber roll, whereby tendency of the foil to stick by cohesion and static attraction to the metal roll and causing choking of the rolls and breakage of the foil will be effectually prevented.

Still another object of the invention is to provide novel time and electrically controlled clutch means and coacting stopping means which are operative to quickly start the feeder for a working cycle and stop it at the end of the working cycle.

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Still another object of the invention is to provide a feeder which will instantly stop in the event that any foreign object enters it and tends to clog it, thereby preventing injury to the machine.

Still another object of the invention is to provide a feeder whereby a given amount of work may be done in less time and with greater efficiency than is possible with other feeders in use, and which may be applied as an attachment to conventional stamping machines.

With these and other objects in view, which will appear in the course of the subjoined description, the invention consists of the novel features of construction, combination and arrangement of parts, hereinafter fully described and claimed, and as shown in the accompanying drawings, in which:

Fig. 1 is a side elevation of a printing or stamping machine equipped with my improved feeder attachment.

Fig. 2 is a top plan view of the feeder with top plate removed and with parts broken away and other parts appearing in section to better disclose the construction.

Fig. 3 is a view in side elevation of the feeder on an enlarged scale showing the rack and pinion motion transmitters in their normal or retracted positions.

Figs. 4, 5, 6 and 7 are vertical longitudinal sections through the feeder taken, respectively, on the lines 4-4, 5-5, 6-6 and 7-7 of Fig. 2.

Fig. 8 is a vertical transverse section through one side of the feeder frame and a portion of the transmission shaft, showing the starting and stopping clutch and cam devices.

Fig. 9 is a cross-section on the line 9-9 of Fig. 8.

Fig. 10 is a view in side elevation and partially in section of one of the rack and pinion motion transmitting devices.

Fig. 11 is a section on line 11-11 of Fig. 12 showing the one-way clutch connection between the drive pinion of the rack and pinion motion transmitting device and the feed roller driven thereby.

Fig. 12 is a section taken on the line 12-12 of Fig. 10.

Fig. 13 is a detail section on line 13-13 of Fig. 10.

Fig. 14 is a diagrammatic view of the power and control circuit and parts arranged therein.

Fig. 15 is a section through the main drive pulley, showing the main drive shaft and pinion

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and the ball release clutch between the pulley and shaft.

Fig. 16 is a view similar to Fig. 1 looking toward the opposite side of the stamping machine and feeder.

Fig. 17 is a detail section on an enlarged scale taken on line 17—17 of Fig. 7.

Fig. 18 is a diagram illustrating variable movements of the foil strips which may be effected through variable throw motions of the rack and pinion motion transmitting devices.

Fig. 19 is a perspective of the double cam which controls the action of the locking plunger or detent and the micro-switch.

Fig. 20 is a view in elevation of a part of the feeder casing showing the timer for periodically closing and opening the motor circuit.

Referring now more particularly to the drawings, 1 represents a printing or stamping machine of a generally conventional type and having a stationary die 2 and a printing bed or platen 3, vertically movable toward and from the die in a printing action. In such action the platen, which supports the article which is to be printed or embossed, moves upwardly to raise the article and foil to printing position whereby the foil is pressed against the printing face of the die which impresses the foil, the impressed portion of the foil being separated from the foil strip and adhesively applied to the article, after which the platen moves downwardly to retracted position to release the article for removal and the foil for a feed action to bring a new portion of the foil into stamping position and in readiness for a repetition of the above described stamping operation. The stamping machine, as stated, may be of any conventional type and operated in any suitable manner. It is not shown in detail and is only conventionally shown for the purpose of illustrating the application of my improved feeder thereto, as, except for its mode of operation in connection with and upon the foil supplied to it by the feeder, its particular construction is immaterial and merely representative of one of various makes of stamping machines to which the feeder may be applied.

The feeder, generally indicated at 4, is illustrated in the form of an attachment to the printing machine, although it is to be understood that it may, if desired, be built into a stamping machine as a component part of the machine.

As shown, the feeder 4 comprises a casing of generally oblong form in plan and including side walls 5 and 6, an inner end wall 7, and a top wall 8, said side walls and the top wall 5 having sloping outer end portions 9 and 10, the latter closing the upper portion of the outer end of the casing. A portion of the wall 8 is cut away or recessed as shown at 11 to receive a bed plate 12 supporting an electric motor 13 and an instrument board 14 having plug in connections 15, 16 and 17, to the terminals of which are connected conductors of an electric controlling circuit generally indicated at 18 in Fig. 14. The connections 15, 16 and 17 are respectively adapted for the engagement therewith of coacting connectors of conductor cords or leads 15', 16' and 17' extending from a source of power (current supply), from the motor 13 and from a timer. The timer may consist of a micro-switch member 19 adapted to be periodically opened and closed by a contact element 20 on or actuated by a suitable part of the running gear of the stamping press, whereby on each printing cycle of the press the circuit 18 will be periodically opened and closed.

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The feeder is suitably attached at its end 7 to one end 21 of the frame or casing of the press above the level of the bed plate 3 so as to be disposed in proper position to feed the foil strip or strips longitudinally of the frame and between the bed plate and die for the action of the die thereon.

Arranged at the opposite end 22 of the press is a support 23 in which are journaled a plurality of supply spools or rolls *a*, *b* and *c* on which a like number of foil strips, sheets or tapes *a'*, *b'*, *c'* are wound and from which the strips are extended downwardly over guide rolls *d*, thence horizontally over the platen 3 to guide rolls *d'*, and thence upwardly to sets of gripping and feed rolls mounted in the feeder and in the operation of which the foil strips are drawn or pulled forwardly the same or different distance on each feed motion, as required, to bring them in stamping position. In the present instance, the feeder is shown as equipped with sets of supply and feed rolls for feeding a single strip or two or three foil strips at a time, although in practice the structural organization may be designed to feed more or less than three strips according to the use to which the machine is to be put.

The sets of gripping and feed rolls are arranged in properly spaced rotation in the casing of the feeder, and each set comprises a knurled or serrated drive roll 24 and coacting pressure and drive roll 25. The roll 24 is preferably made of metal and is rotatable on a fixed axis, said roll having a spindle 26 at one end journaled in the wall 5 and a spindle 27 at its opposite end journaled in the wall 6 and extending outwardly therethrough. The roll 25 is preferably a rubber surfaced roll arranged to yieldingly press the foil against the surface of the roll 24, whereby the foil is gripped for a feed action sufficiently tight to prevent slippage. The rolls are coupled at their ends adjacent the wall 6 by gears 28 and 28' to rotate in unison at the same peripheral speed. Roll 25 is journaled at its ends in a bracket embodying spaced arms 29 pivoted at 29' to the walls 5 and 6 for swinging adjustment of the roll 25 toward and from the roll 24, said arms being connected by an upper arcuately curved or hood shaped deflector plate 31 and an outer outwardly and downwardly inclined deflector or guide plate 32. The lower ends 30 of these arms project below their pivots to form counterweights and handles for convenience in moving the roll 25 away from the roll 24 to release foil in case the foil is started in the wrong place. Springs 31' arranged between the forward portions of the bracket arms and seat blocks 32' cooperate with the counterweights to overcome this tendency and to cause the roll to press the foil with just sufficient pressure against the roll 24 to cause the foil to be gripped without injury but for a positive feed motion during a feed action of the rolls and a positive holding action when the rolls are at rest. The rolls operate to pull or draw the foil forwardly when they are in motion, the foil passing between them and beneath the deflector 31 and downwardly and outwardly over the guide plate 32. The function of the curved deflector 31 is to guide the foil as it issues from the roll toward the guide plate 32, by which further contact of the foil with the rolls beyond the gripping point is prevented. The tendency of the foil as it passes beyond the gripping portions of the rolls is to follow along and cling by cohesion and static attraction to the surface of the roll 24, which, if allowed, would cause an accumulation of foil in

the region of the gripping point and clogging of the rolls with liability of stoppage of the feeder and breakage of the delicate foil and loss of time required to remedy the difficulty, as well as waste of foil. The deflectors overcome this objection and allow rapid feed motion to increase production without liability of the stoppage of and possibility of damage to the machine or waste of foil.

The mechanism which directly drives the sets of rolls comprises motion transmitting devices, one for each set, mounted on the side wall 6 and operating to drive the shafts 24 on each feed motion and at the proper time period. Each of these devices consists of a rotary crank wheel or disk 33 mounted on a shaft 34 journaled in the wall 6 and a bearing bar or plate 35 spaced therefrom, said disk being provided in its outer surface with a diametrically disposed slot or guideway 36 in which is slidably fitted a block 37 carrying a crank pin 38. This block is adjustable in the slot to vary the radius or working throw of the crank pin and is adapted to be secured in any position of adjustment by means of a binding screw 39. To the pin 38 is connected one end of a rack bar 40, the toothed portion of which is slidable in a guide sleeve 41 rockably mounted on the journal end 27 of the associated roll 24 projecting outward through the wall 6. The teeth of the rack bar mesh with a drive pinion 42 loosely mounted on said end of the roll 24. The pinion is fixed to a clutch disk 43, also loosely mounted on the end of the roll 24 and which is seated in a recess 44' formed in the outer face of a coactive clutch disk 44 fixed to said end of the roll. The disk 43 is provided with peripheral slots 45 in which and between the same and the rim 45' of the recess 44' are seated balls or rolls 46. The slots are of a form varying in depth from one end to the other and providing with the balls a well-known one-way type of clutch for coupling the pinion 42 and disk 43 to the disk 44 on an outward or working rotation of the rack bar and permitting the parts 42 and 43 to run free in the opposite direction of movement or retraction of the rack bar. Thus on each forward movement of the rack bar the rolls 24 and 25 will be driven to feed the foil a predetermined distance forward, the distance being governed by the position of the crank pin 38, while on the return motion of the rack bar the rolls will remain idle to grip the stationary foil during the period while the stamping work is being done. During the operation described the crank disk makes one complete revolution and the rolls 24, 25 are revolved a given number of times to feed the foil a greater or less distance governed by the radial position of the pin 38, the rack bar in its reciprocating motion being rockable with the sleeve 41 to accommodate itself to the rotary movement of the pin 38.

The use of the rack and pinion drive for the feeding rolls allows a very rapid feed motion to be obtained to increase the production of the machine, as well as a very positive and exact movement of the foil to the amount or extent required for any stamping operation, without liability of clogging of the foil or injury thereto. By adjustment of the crank pin the range of movement of the rack bar may be varied and determined to an exact degree, to vary the amount of foil fed up for use as required for any stamping action.

As before stated, provision may be made for feeding any number of foil strips, from one to three or more, to the stamping machine, and

that in the present instance, provision is made for feeding three such strips at a time and to the same or different degrees according to the amount or portion of each to be used in a stamping operation, and/or to the relative positions of the foil material to be impressed upon the book cover or other article by different embossing portions of the die or dies. It will be understood that by adjustment of the blocks 37 carrying the crank pins 38, to set the pins radially to the same or different positions, each rack bar may be caused to have any desired range of feed motion, accurately determined by a scale 47 on its crank disk 33, which range of feed motion may be the same or different with respect to the rack bars of the sets. In other words, variable rack and pinion drive devices for the feed rolls are provided to govern the feeding actions of the rolls to accurately feed one or more strips of foil to the exact degree or degrees required to suit the stamping die, which not only insures rapid operation but a great saving in foil. Fig. 18 illustrates diagrammatically and exemplificatively a feed action in which the respective strips a', b' and c' are moved to different degrees to bring unused portions of the strips into stamping positions beneath different impression portions 3a, 3b, and 3c of the die 3. By adjustment of the actuating crank pin of any of the rack bars to a neutral position in which its crank disk will turn idly, the rack bar may be thrown out of action, so that any one or two of the strip feed devices may be used without the others.

The drive gearing for periodically driving the rack and pinion devices and means for controlling the action of the drive gearing will now be described.

Journaled in wall 5 of the feeder and a bracket 48' attached thereto is a drive shaft 48. A drive pulley 49 is loosely mounted on a sleeve 50 which is fast on the shaft, said sleeve having a disk flange 50'. The pulley is formed with sockets 51 containing coil springs 52 and the flange with coacting ball seats 53, and balls 53' are held partially in the seats and sockets, so as to couple the pulley and sleeve together, by the pressure of the coil springs 52. The pulley, which is driven by a belt 54 from the motor 13, is thus normally connected to the shaft by a ball release clutch, whereby the shaft is adapted to be driven in the proper direction when the motor is in operation. In the event, however, that the machine should become clogged or the motion of the shaft 48 arrested by any obstruction in the machine, the balls will be displaced from the seats 53 and into the sockets, thus allowing the pulley to run free to prevent damage to the machine.

Shaft 48 carries a drive pinion 55 which meshes with a gear 56 loosely mounted on the end of a transverse transmission shaft 57 journaled in the wall 5, said shaft being journaled at its opposite end in the wall 6 and plate 35. The gear 56 mounted on the first-named end of the shaft 57 is adapted to be driven by pinion 55 to impart motion to shaft 57 in a manner herein-after described. The second-named end of said shaft 57 carries a transmission gear 58 meshing with gears 59 and 60 on the shafts of two of the crank disks 33, gear 60 in turn transmitting motion to an idler gear 61 and through the same to a gear 62 on the shaft of the third crank disk 33, whereby when the shaft 57 is driven the crank disks are driven therefrom.

Gear 56 has a clutch face provided with an

annular series of beveled clutch teeth 63 each provided with a shoulder 63' arranged to lie in the path of the free end of a clutch dog 64 pivotally mounted at its opposite end, as at 65, in a longitudinal recess 66 formed in the shaft 57, the dog being normally under pressure of a spring 67 tending to swing it outwardly to cause its free end to project radially from the shaft beyond the recess. The free end of the dog has a seat face 68 normally engaged by the beveled outer end 69 of a sliding latch 70. The dog 64 is adapted, when free to swing outward, to engage a tooth 63 of gear 56 to couple said gear to the shaft 57 and effect the driving of the shaft for a working operation of the strip feeding devices, but when the dog is engaged by the latch 70 it will be held retracted and out of the path of the teeth 63 so that, although the shaft 48 and gears 55 and 56 may be continuously driven, shaft 57 will remain idle until the dog 64 is released by the latch 70 and engages one of the teeth 63 to couple the gear 56 and shaft 57 together. On the shaft 57 is also mounted a double cam embodying a cam member 71 having a 90° cam rib or portion 72 and a cam member 73 having a cam locking recess 74 adapted to be engaged by a stop roller 75 on one end of a sliding detent or locking plunger 76 mounted in a guide casing 77 on the bottom of the motor bed and normally urged to engaging position by a spring 78. Latch 70 is mounted in a guide casing 79 and normally urged outward to locking position by a spring 79' and said latch is connected to the armature core 80 of an electric solenoid 81. The solenoid and a micro-switch 82 are arranged in the controlling circuit 13. The solenoid and detent as well as the latch are preferably mounted on the underside of the motor bed to form therewith and with the motor, and the instrument board and its attachments, if desired, a readily attachable and detachable unit. The lever member 83 of the micro-switch 82 is arranged so as to be periodically engaged and released by the cam rib 72 of cam member 71. The circuit 18 includes the solenoid coil, the micro-switch and three plug-in sockets 15, 16 and 17 adapted to be engaged, respectively, as hereinbefore stated, by a connector plug 15' on a cord or conductor leading from a power circuit or source of current supply, a connector plug 16' on a cord or conductor leading from the motor, and a connector plug 17' leading from a timer, as previously stated, mounted on the stamping machine. This timer may consist of a micro-switch member 19 arranged so as to be periodically closed and opened by an operating or controlling cam or element 20 arranged on or actuated by some suitable part of the running gear of the stamping machine, so that the feeder will be operated in synchronism or timed accord with the stamping die of the stamping machine.

Having described in general the working operations of the several parts of the feeder, the operation of the stamping machine and feeder may be briefly described as follows:

Assuming that the stamping machine is running with the work to be embossed resting on the platen, that the foil feed motor is in operation with the pulley 49 running idly, that that portion of the circuit including the motor is in connection with the source of current, that the foil strips are arranged for unused portions of the strips to be fed up, and that the timer switch 19, which operates once on each working cycle of the stamping machine, is about to

be closed by member 20 to connect that portion of the circuit 18 containing the solenoid 81, and normally closed by the micro-switch 82, with the source of current, it will be understood that on the closing of the switch 19 the solenoid will be energized to retract the latch 70, whereupon the dog 64 will engage the clutch member 63 to set the shaft 57 in motion. When this shaft begins to turn, the rib 72 on the cam 71 engages and moves the micro-switch lever 83 and actuates the micro-switch 82 which breaks solenoid circuit, causing the solenoid to release the latch 70 on a 90° turn so that thereafter the free end of the latch will travel in contact with the surface of the shaft 57 until the shaft has made one complete rotation when the latch will again engage and retracts the dog to stop the motion of the shaft 57 and operation of the feeder. The use of the micro-switch allows a quick stopping action to be obtained at the instant the foil strips are brought up to the exact impression position for each strip. The setting of the shaft 57 in motion causes movement of cam member 73 to withdraw its locking recess 74 from engagement with the roller 75 of the detent 76 and to hold the detent retracted until the recess 74 again comes into register with the roller, whereupon the detent will be projected into locking engagement with the recess to lock the shaft 57 and the strip feeders against casual motion and in retracted position, at the instant the rotation of the shaft 57 ceases at the end of a strip feeding operation in readiness for the next succeeding strip feeding operation of the stamping machine and feeder. The setting of the shaft 57 into motion effects actuation of the rack and pinion strip feeding devices, which on their forward strokes rotate the sets of rolls 24 and 25 for a feed action and then return on an idle stroke or traverse back to normal position, such idle traverse being permitted by their one-way clutch connections with the rollers.

It will be observed that in my machine the construction and arrangement is such that the drive shaft, transmission shaft, crank disks, and gearing for operating the disks are disposed and supported at the upper portion of the feeder casing in spaced relation longitudinally of the casing, while the sets of feed rolls are disposed and supported at the lower portion of the casing below the first named parts and likewise in spaced relation longitudinally of the feeder casing, and that the drive pulley 49 is mounted with the drive shaft at one side of the casing, while the crank disks, their drive gears and the rack and pinion connections between the disks and feed rolls are disposed wholly at the opposite side of the casing. This arrangement adapts the feeder to be mounted on a conventional stamping machine having a stationary die and a platen movable upwardly toward and downwardly from the die so that all parts of the feeder are arranged at a low level for ready accessibility in inspecting, cleaning, repairing and adjusting them to keep the feeder in proper working order and to permit of the feed of the foil strips horizontally so that no portions of the strips either before or after impressions are made can come in contact with and catch in or otherwise interfere with the gearing or control elements of the feeder. The described construction and arrangement of the transmission gears and crank disks at the same side of the feeder casing also permits of the convenient adjustment of the crank pins of the crank disks in

a ready, quick and convenient manner, whenever necessary, and also permits of a spacing arrangement of the disks, rack bars and sets of feed rolls to allow two, three or more sets of feed rolls and their driving devices to be used without interfering with the mounting of the control elements in the upper part of the casing for protection and cooperation with the transmission shaft. Furthermore, such construction and arrangement of the parts permits the operator to have greater ease and convenience in reaching and handling the foil strips for inspection, threading them through the machine, freeing them in case of clogging, or performing other operations not conveniently possible where superposed sets of rolls are arranged above and driven from a transmission shaft arranged at a required lower level, as in the case of a machine which feeds the foil strips upwardly past a vertical die and a pattern operated by the transmission shaft and where the rolls are necessarily disposed above and at a high elevation relative to the shaft, die and platen. My feeder possesses these and other advantages over a feeder employing sets of superposed feed rolls mounted above a die and platen and operated by rack and pinion gearing driven by crank disks mounted at the opposite ends of a transmission shaft, which permits of the use of two sets of feed rolls only and consequently only two foil strip feed ranges, whereas my construction permits of the use of two, three or more sets of rolls, limited only by the spacing of the sets of rolls and the length of the feeder frame, so that three or more strips may be fed independently or simultaneously the same or different distances on each feed motion of the feeder.

From the foregoing description, taken in connection with the drawings, the construction and mode of operation of my improved foil feeder will be readily understood by those versed in the art without a further and extended description. It will be seen that the invention provides for the feeding of a single foil strip or a plurality of foil strips, and that in each case the foil strip or strips may be fed without slack and with great exactitude to proper stamping position or positions with respect to the stamping die or dies. Also it will be seen that the feeder provides for quick starting, feeding and stopping actions on each working cycle, without any tendency to clog the rolls or cause excess tension on and breakage of the strips, whereby a feeder of increased efficiency and production speed is furnished and one which effectually prevents waste of foil. Other advantages of the invention have been set forth or will be apparent from the foregoing description and will be readily appreciated by those versed in the art.

It will, of course, be understood that while the construction of the feeder as herein disclosed is preferred, changes in the form, construction and arrangement of the parts are possible and may be made, within the scope of the appended claims, without departing from the spirit or sacrificing any of the advantages of the invention.

Having thus described my invention, I claim:

1. In a foil feeder for printing or stamping machines, feed rolls, a motor driven drive shaft, periodically operated means for operating the rolls including a rotary transmission shaft, a normally inactive clutch device for connecting said transmission shaft with and disconnecting it from the drive shaft, a solenoid operated latch

device for normally holding the clutch device from action and releasing it for action, an electric circuit including the solenoid, means automatically operated by and on each working cycle of the stamping machine for controlling the circuit to energize the solenoid to release the clutch device to start the transmission shaft in motion, and means in the circuit and controlled by movement of the transmission shaft to keep the solenoid energized during a predetermined portion of the rotation of the transmission shaft and then causing its deenergization to render the clutch device inactive.

2. In a foil feeder for printing or stamping machines, foil feed rolls, a motor driven drive shaft, transmission means including a transmission shaft for periodically operating the feed rolls, an automatically acting clutch for connecting and disconnecting said shafts, an electric circuit including a latch to normally hold the clutch retracted, a solenoid to release the latch, a switch in said circuit controlling the action of the solenoid, a timer governed in action by the stamping machine and controlling the circuit to initially energize the solenoid to retract the latch, and means controlled by the transmission means and operated to throw the switch into and out of action to keep the solenoid energized during a predetermined portion of rotation of the transmission shaft and then deenergize it.

3. In a foil feeder for printing or stamping machines, feed rolls, a motor driven drive shaft, a transmission shaft adapted to be driven from the drive shaft, a crank driven rack and pinion device for driving the rolls from the transmission shaft, an automatic clutch device for connecting the drive shaft with the transmission shaft, a latch device for holding the clutch device from action and releasing it for action, and periodically operated automatic electric means controlling the operation of the latch, said means comprising a normally open electric circuit, a timer operated by the stamping machine and acting once on each cycle of operation of the machine and rotation of the drive shaft to close the electric circuit, a solenoid in said circuit energized when the circuit is closed to retract the latch, said circuit including two branches and an automatically closing switch normally connecting the branches to permit the solenoid to be energized when the circuit is closed by the timer, and means on the transmission shaft and operated thereby during a predetermined portion of the rotation of the shaft to engage and operate the switch to break the electric circuit.

4. In a foil feeder for printing or stamping machines, feed rolls, a motor driven driving element, a transmission shaft, a normally inactive clutch device including an automatically projectible clutch member carried by the shaft for connecting said element with and disconnecting it from the shaft, a solenoid operated latch device for normally holding said clutch member from action and releasing it for action, an electric circuit for energizing and deenergizing the solenoid, a timer operated by the stamping machine one on each cycle of operation of the machine and rotation of the drive shaft to energize and deenergize the electric circuit, and a controlling device in the circuit for normally maintaining the circuit in condition to be energized by the timer and controlled by movement of the transmission shaft to keep the circuit in such condition and the solenoid energized

during a predetermined portion of the working movement of the transmission shaft and then interrupting the circuit to effect its deenergization and render the clutch device inactive.

5. In a foil feeder for printing or stamping machines, foil feed rolls, a motor driven drive shaft, transmission means including a transmission shaft rotated once on each cycle of operation of the machine for periodically operating the feed rolls, an automatically acting clutch for connecting and disconnecting said shafts, an electric circuit including a latch to normally hold the clutch retracted, a solenoid to release the latch, a timer operated by and in synchronism with the stamping machine to periodically open and close the circuit, and an interrupter in the circuit normally maintaining the circuit in condition to be energized by the timer and controlled by the transmission means to govern the action of the solenoid while the timer is in action to keep the circuit energized for a period while the transmission shaft is rotating and then interrupt it to deenergize the solenoid.

6. In a foil feeder for printing or stamping machines, feed rolls, a motor driven drive shaft, periodically operated means for operating the rolls including a transmission element, a normally inactive clutch device automatically movable to clutching position when free for action to connect said element with the drive shaft, a solenoid operated holding device for normally holding the clutch device from action and releasing it for action, an electric circuit including the solenoid, means automatically operated by the stamping machine and controlling the circuit to energize the solenoid to retract the holding device so as to release the clutch device for action to start the transmission element in motion, and means in the circuit normally maintaining said circuit in condition to be energized by the timer and controlled by movement of the transmission element to maintain such condition of the circuit to keep the solenoid energized during a predetermined portion of the working movement of the transmission element and then causing its deenergization to render the clutch device inactive.

7. In a foil feeder for printing or stamping machines, foil feed rolls, a motor driven drive shaft, transmission means including a transmission shaft for periodically operating the feed rolls, an automatically acting clutch for connecting and disconnecting said shafts, a latch to normally hold the clutch retracted, a normally open electric circuit having two branches, a solenoid in said circuit operable when energized to release the latch and a switch device normally connecting the circuit branches to adapt the circuit when closed to energize the solenoid, a timer governed in action by the stamping machine for periodically closing and opening said circuit, and means controlled by the transmission means and controlling the action of the switch device to first open it at a certain time period in the orbit of rotation of the transmission shaft and then release it to permit it to close at a later time period in the orbit of rotation of the transmission shaft.

8. In a foil feeder for printing and stamping machines, feed rolls, a motor driven drive shaft, periodically operated means for operating the rolls including a transmission shaft, a normally inactive clutch device for connecting said transmission shaft with and disconnecting it

from the drive shaft, a normally open electric circuit, a solenoid operated latch device in said circuit for normally holding the clutch device from action and releasing it for action, an electric circuit including the solenoid, means automatically operating on each cycle of operation of the stamping machine for controlling the circuit said means including a device for closing the circuit to energize the solenoid to release the clutch device to start the transmission shaft in motion and also including a device normally maintaining the circuit in condition to be closed by the first mentioned device and controlled by movement of the transmission shaft to keep the solenoid energized during a portion of the orbit of rotation of the transmission shaft and then causing its deenergization to render the clutch device inactive, an automatic detent engageable with the transmission shaft at the end of its working movement to hold said shaft when at rest against casual rotation, and means for retracting said detent when the shafts are clutched together.

9. In a foil feeder for printing or stamping machines, the combination of a casing or frame, a drive shaft journaled on the frame at one side thereof, a transmission shaft journaled on and extending horizontally across the frame, a train of gears at the opposite side of the frame comprising a primary drive gear on the transmission shaft, a plurality of secondary drive gears journaled on the frame and intermediate spacing and motion transmitting gears arranged between and serially connecting said drive gears with one another and spacing the same from each other in a direction longitudinally of the frame, a plurality of sets of feed rolls extending transversely of and journaled on the frame below the level of said gears and in spaced relation to each other longitudinally of the frame, rack and pinion devices having one-way clutches connecting the respective drive gears with the respective sets of rolls at the second named side of the frame, whereby said gears and rack and pinion devices are mounted in following order at one and the same side of the frame above sets of rolls arranged to feed a plurality of foil strips longitudinally of the frame below the level of the transmission shaft and the train of gears driving the rack and pinion devices therefrom, a clutch device for connecting the drive shaft with the adjacent end of the transmission shaft, and means mounted on the frame for throwing the clutch device into and out of action to periodically connect the transmission shaft with the drive shaft and disconnect it therefrom.

10. In a foil feeder for printing or stamping machines, the combination of a casing or frame, a drive shaft journaled on the frame at one side thereof, a transmission shaft journaled on and extending horizontally across the frame, a train of gears at the opposite side of the frame comprising a primary drive gear on the transmission shaft, a plurality of secondary drive gears journaled on the frame and intermediate spacing and motion transmitting gears arranged between and serially connecting said drive gears with one another and spacing the same from each other in a direction longitudinally of the frame, a plurality of sets of feed rolls extending transversely of and journaled on the frame below the level of said gears and in spaced relation to each other longitudinally of the frame, rack and pinion devices having one-way clutches connecting the respective drive gears with the

respective sets of rolls at the second named side of the frame, whereby said gears and rack and pinion devices are mounted in following order at one and the same side of the frame above sets of rolls arranged to feed a plurality of foil strips longitudinally of the frame below the level of the transmission shaft and train of gears, a clutch device for connecting the drive shaft with the adjacent and of the transmission shaft, and means mounted at the upper portion of the frame above the level of the rolls and substantially in the same horizontal plane as the transmission shaft for throwing the clutch device into and out of action to periodically connect the transmission shaft with the drive shaft and disconnect it therefrom.

11. In a foil feeder for printing or stamping machines, the combination of a casing or frame, a drive shaft journaled on the frame at one side thereof, a transmission shaft journaled on and extending horizontally across the frame, a train of gears at the opposite side of the frame comprising a primary drive gear on the transmission shaft, a plurality of secondary drive gears journaled on the frame and intermediate spacing and motion transmitting gears arranged between and serially connecting said drive gears with one another and spacing the same from each other in a direction longitudinally of the frame, a plurality of sets of feed rolls extending transversely of and journaled on the frame below the level of said gears and in spaced relation to each other longitudinally of the frame, rack and pinion devices having one-way clutches connecting the respective drive gears with the respective sets of rolls at the second named side of the frame, whereby said gears and rack and pinion devices are mounted in following order at one and the same side of the frame above sets of rolls arranged to feed a plurality of foil strips longitudinally of the frame below the level of the transmission shaft and train of gears, a clutch device for connecting the drive shaft with the adjacent end of the transmission shaft, and automatic electric control means mounted on the frame above the level of the rolls and comprising a clutch device for connecting the drive shaft with and disconnecting it from the transmission shaft, an electric circuit including a solenoid for throwing the clutch into and out of action when the circuit is respectively energized and deenergized, a switch actuated by the stamping machine on each cycle of operation thereof to energize said circuit, and a switch operated by the transmission shaft, for thereafter interrupting said circuit.

12. In a foil feeder for printing or stamping machines, the combination of a horizontally disposed casing or frame, a drive shaft journaled on the frame at one side thereof, a transmission shaft journaled on and extending horizontally across the frame, a train of gears at the opposite side of the frame comprising a primary drive gear on the transmission shaft, a plurality

of secondary drive gears journaled on the frame and intermediate spacing and motion transmitting gears connecting said drive gears and spacing the same from each other in a direction longitudinally of the frame, a plurality of sets of feed rolls extending transversely of and journaled on the frame below the level of said gears and in spaced relation to each other longitudinally of the frame, rack and pinion devices having one-way clutches connecting the respective drive gears with the respective sets of rolls at the second named side of the frame, whereby said gears and rack and pinion devices are mounted in following order at one and the same side of the frame and whereby the sets of rolls are arranged to feed a plurality of foil strips longitudinally of the frame below the level of the transmission shaft and train of gears, a clutch device for connecting the drive shaft with the adjacent end of the transmission shaft, and automatic electric control means mounted on the frame above the level of the rolls and including a solenoid for throwing the clutch device into and out of action and switches operated respectively by the stamping machine and by the transmission shaft to periodically energize and deenergize the solenoid.

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