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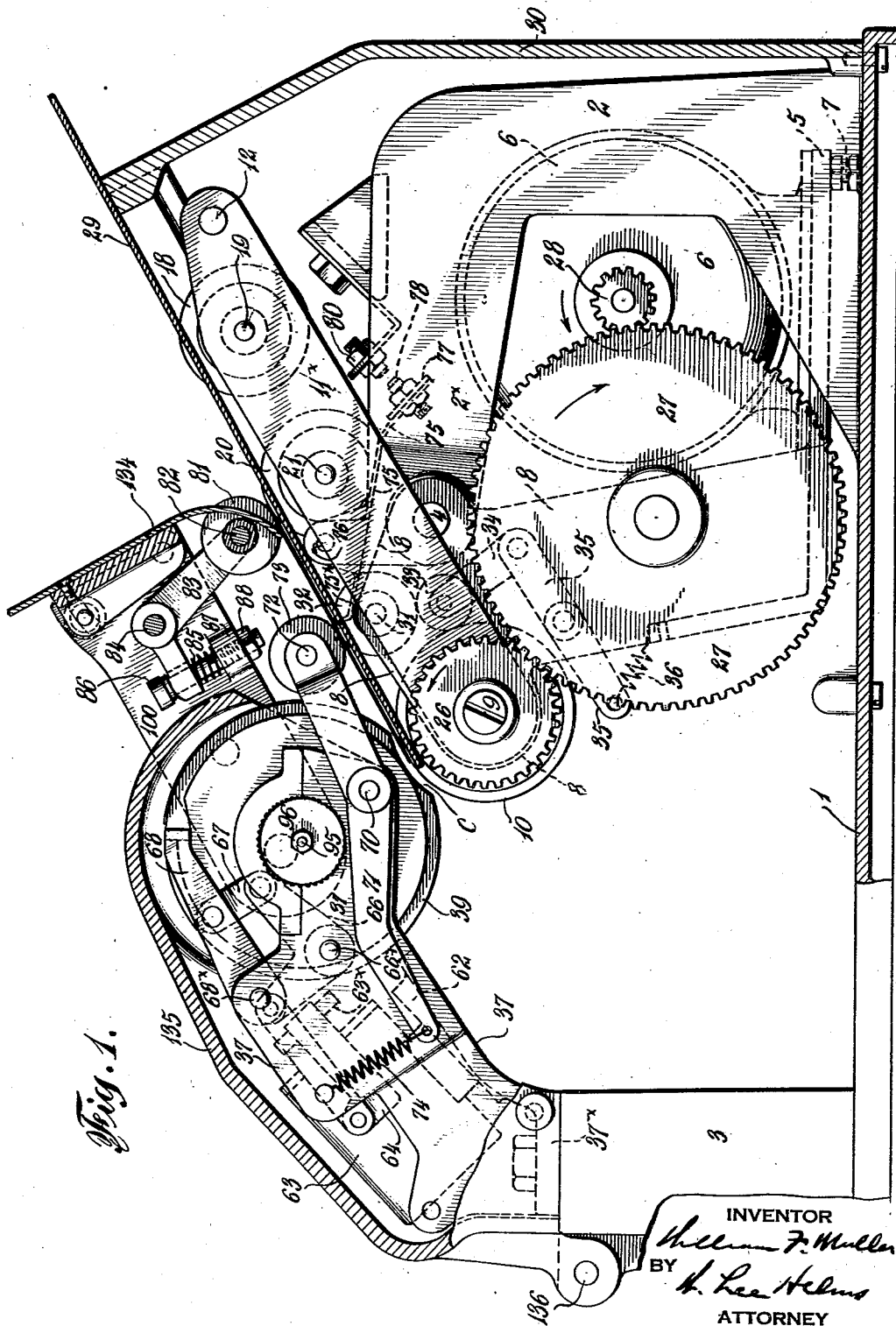
W. F. MULLER

2,173,454

AUTOMATIC ROTARY CHECK ENDORSER

Filed Nov. 24, 1937

6 Sheets-Sheet 1



Sept. 19, 1939.

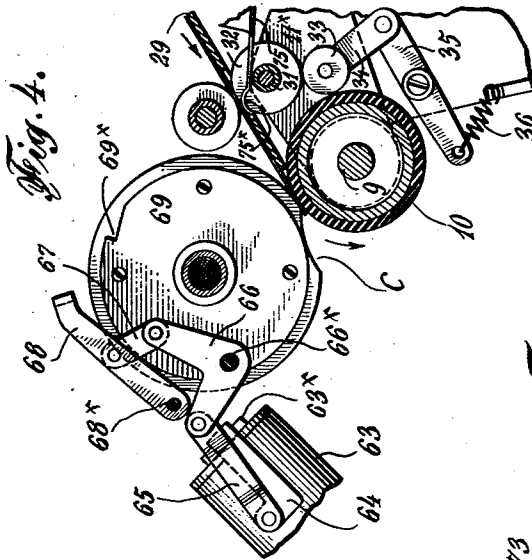
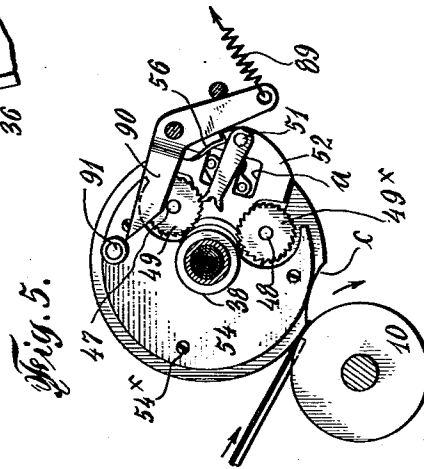
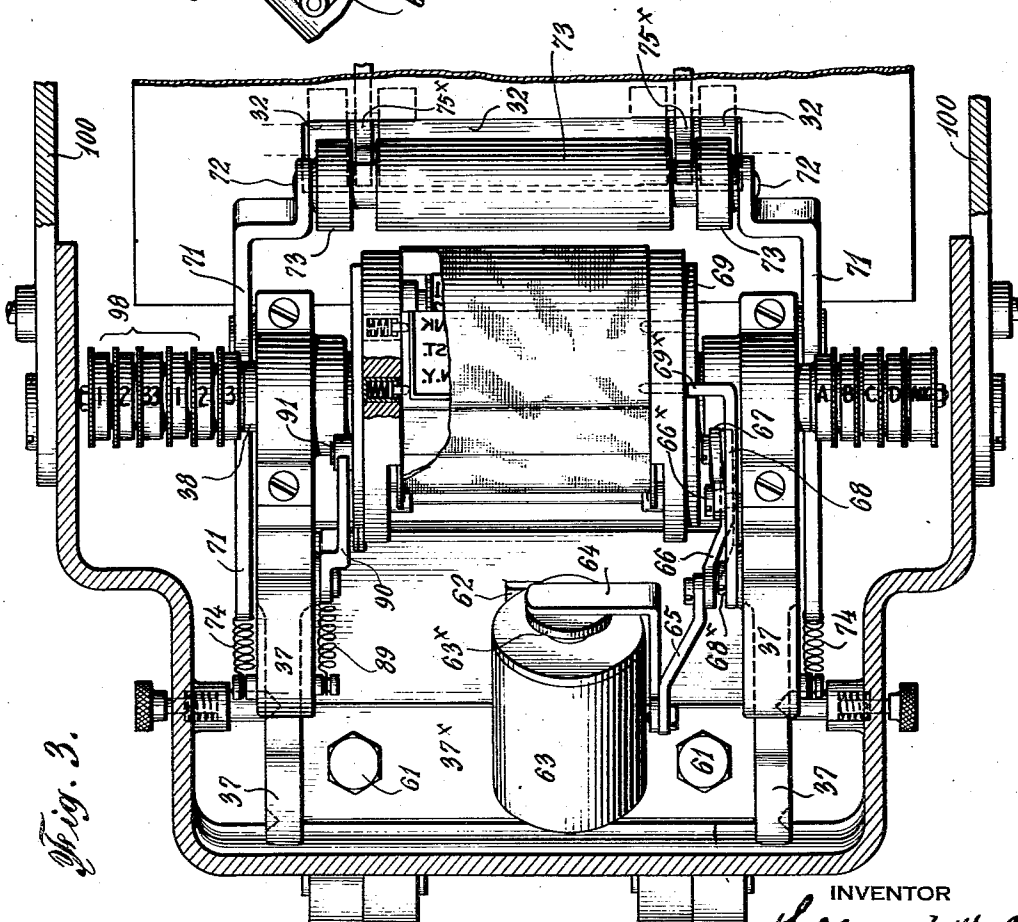
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AUTOMATIC ROTARY CHECK ENDORSER

Filed Nov. 24, 1937

6 Sheets-Sheet 3



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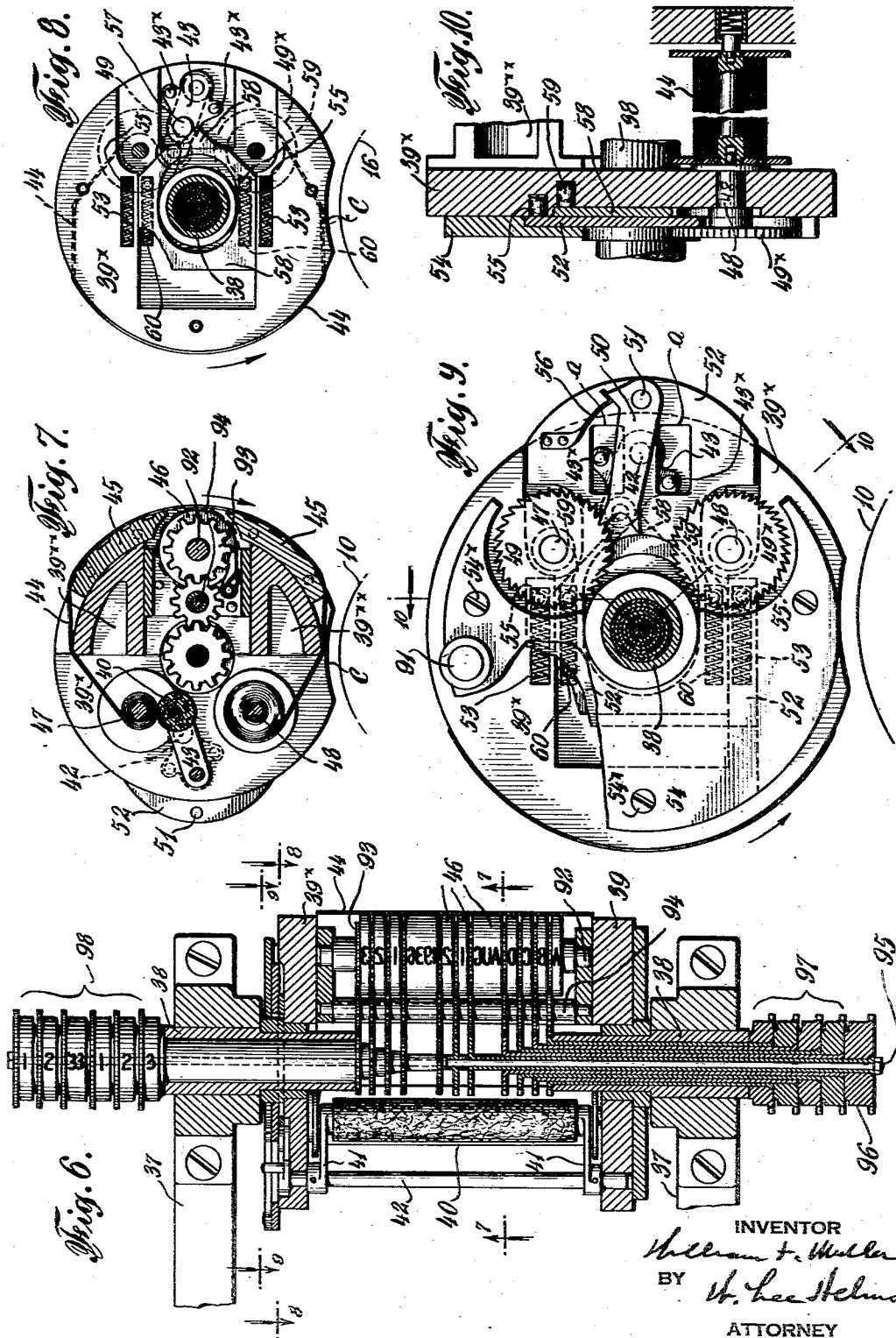
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AUTOMATIC ROTARY CHECK ENDORSER

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6 Sheets-Sheet 4



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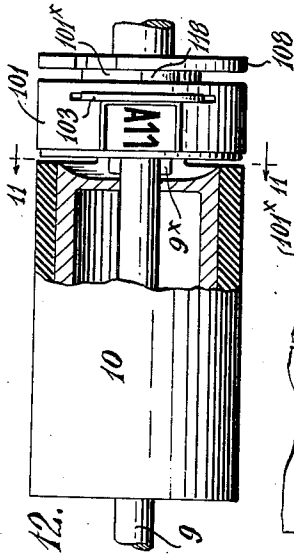
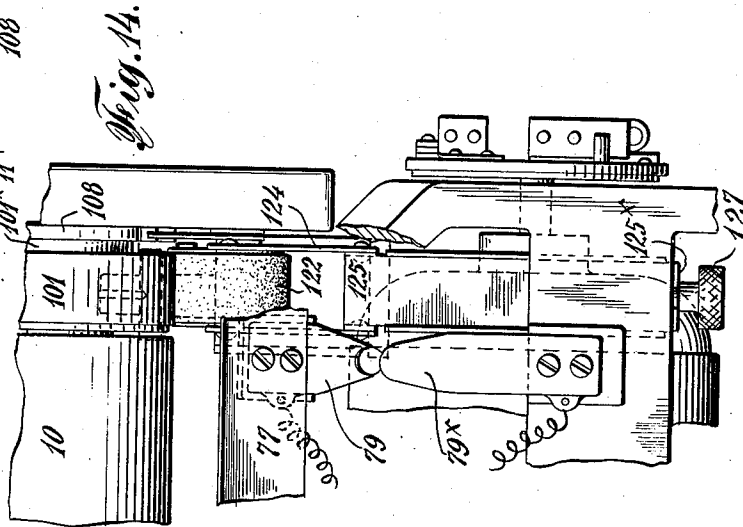
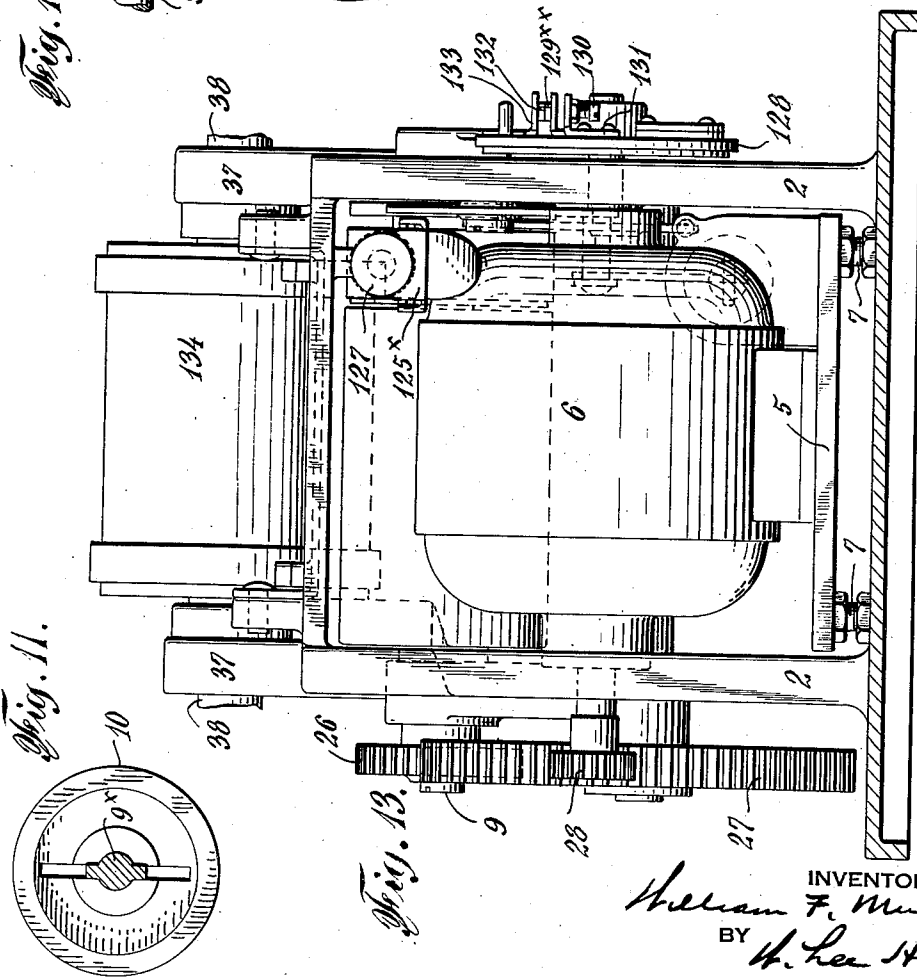
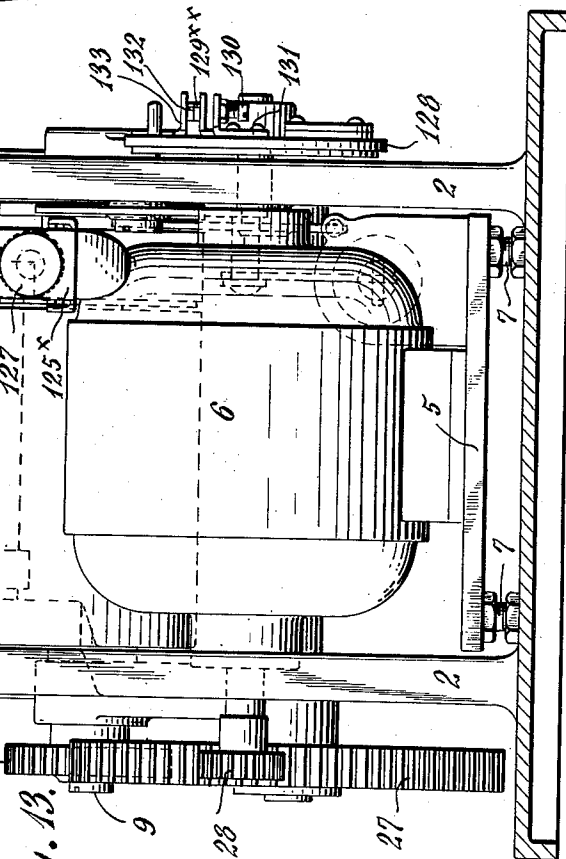
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AUTOMATIC ROTARY CHECK ENDORSER

Filed Nov. 24, 1937

6 Sheets-Sheet 5



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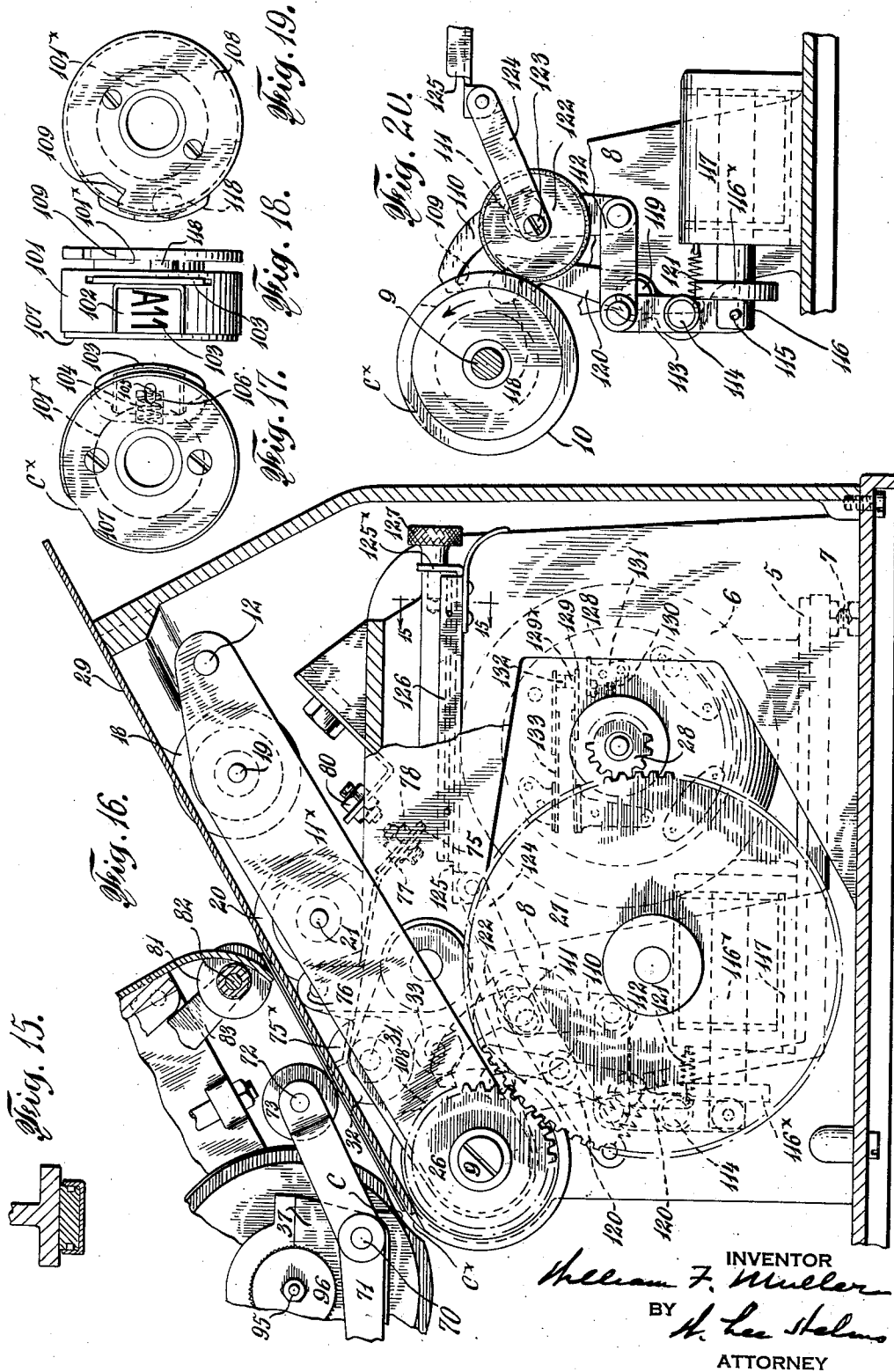
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AUTOMATIC ROTARY CHECK ENDORSER

Filed Nov. 24, 1937

6 Sheets-Sheet 6.



UNITED STATES PATENT OFFICE

2,173,454

AUTOMATIC ROTARY CHECK ENDORSER

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8 Claims. (Cl. 101—235)

The present invention relates to an automatic rotary check endorser. Generally the machine comprises a rotary die head incorporating printing elements, transferring the imprint through the instrumentality of a ribbon, the die head embodying novel means for causing feed and reverse feed of the ribbon.

A further object of the invention is to provide means by which the sheets to be printed will throw into action means for causing a single active rotation of the die head after which it is brought to rest to await a fresh sheet.

The invention also comprises special means for latching the die head in idle position and for giving an initial partial rotation thereto, independently of the feeding means, preliminary to a complete active rotation.

The invention also comprises novel feeding means and adjustments therefor, and a feature of the invention is the provision of underprinting mechanism adapted to act upon the reverse side of a check or other sheet.

These and other objects of the invention will be described with reference to the accompanying drawings in which—

Figure 1 is a view in sectional elevation of a machine embodying the invention, taken near one side of the machine, and

Figure 2 is a view similar to Figure 1, the section being taken near the opposite side of the machine.

Figure 3 is a plan view, partly in horizontal section, showing the die head end of the machine.

Figure 4 is a view in end elevation of the die head, illustrating more particularly the solenoid-operated latch mechanism in elevation.

Figure 5 is a side elevation at the end of the die head opposite that shown in Figure 4, showing more particularly the throw-in pawl mechanism in elevation.

Figure 6 is a horizontal section taken through the die head.

Figure 7 is a transverse section on the line 7—7, Figure 6.

Figure 8 is a transverse section on the line 8—8, Figure 6.

Figure 9 is a transverse section on the line 9—9, Figure 6.

Figure 10 is a vertical section on the line 10—10, Figure 9.

Figure 11 is a sectional elevation on the line 11—11, Figure 12, looking in the direction of the arrows.

Figure 12 is a plan view of the under-printing

die and associated feed roller, the latter being shown partly broken away.

Figure 13 is a rear end elevation of the machine.

Figure 14 is a fragmentary plan view of one side of the machine, to illustrate the connecting contact carrying bar 77 at the end thereof carrying the contact 79 for the under-printing control.

Figure 15 is a fragmentary vertical section on the line 15—15, Figure 16.

Figure 16 is a side elevation of a machine showing in dotted lines elements of the underprinting actuating and control mechanism.

Figure 17 is a side elevation of the underprinting die.

Figure 18 is a plan view of the underprinting die.

Figure 19 is a side elevation of the underprinting die taken at that side opposite Figure 17.

Figure 20 is a view in side elevation of the underprinting die and latching and throw-in mechanism therefor.

Referring to the drawings, I have shown at 1 a base frame member from which rises at the front thereof a standard 2 for supporting the feed mechanism; and at the rear of the base frame member rises a standard 3 for supporting the printing mechanism.

The feed mechanism

At each side of the standard 2 the latter carries at its top a rearwardly projected area 2x, the spaced arms carrying between them a pivot shaft 4. Pivoted on shaft 4 is a rock frame which comprises a horizontal base plate 5 on which a motor 6 is mounted. Below the motor base plate 5 may be provided with adjustable studs 7 of any suitable construction to be raised or lowered so as to provide a limited adjustment of the rock frame from its base.

Rising from each side of base plate 5, rearwardly thereof, is an arm 8 pivotally mounted on shaft 4. The upper boundary of each arm 8 is indicated by the dotted and full lines bearing that numeral in Figures 1 and 2. It will thus be seen that the top of each arm 8 is roughly T-shaped. The upper rear portion of each arm 8 is apertured to receive a shaft 9 which supports the rearmost feed roller 10 which serves as a platen for the die head later to be described.

Shaft 9 also supports at each end thereof one of two rock arms 11, 11x, which are connected at their front ends by a cross rod 12. One of the two rock arms 11, is formed with a depending

arm, as shown in Figure 2, connected to an adjusting rod 13, the forward end of the latter passing through the aperture of a boss 14 formed laterally on standard 2. The rod receives a spring 15, one end of the latter abutting the boss and the opposite end a collar 16 fixed to the rod. At its forward end the rod is threaded to receive a thumb sleeve 17 which abuts the boss. Thus by rotation of the thumb sleeve in one direction, the rod may be moved forwardly against the tension of the spring, reverse rotation of the sleeve enabling the spring to reversely move the rod. In this manner, the rock arm construction may be swung on its pivot shaft 9 in either of two directions.

The rock arm construction comprising the arms 11, 11x, and their connecting cross rod 12, is utilized as a carrier for a plurality of lower feed rolls which may be given positive rotation by the motor 6. These rolls are shown at 18 on a shaft 19 and at 20 on a shaft 21.

Adjacent arm 11 each of the shafts 19, 21, carries a pinion 22, the pinions being in mesh with a connecting larger pinion 23 on a short stud shaft 23x. Pinion 22 is driven by a large pinion 24 on a stud shaft 24x which is in mesh with a gear wheel 25 on shaft 9. At the opposite end of shaft 9 the latter carries a pinion 26 in mesh with a large pinion 27 driven by motor gear wheel 28.

A supporting plate 29 for the fed sheets may be supported on a front riser 30 carried by base 1 and this plate may be cut away at the rollers 18 and 20 for clearance.

Each arm 8 may be apertured so that the arms may receive a shaft 31 carrying a feed roller 32 driven by frictional contact with an underlying second friction roller 33 engaging lower feed roller 10, roller 33 being carried by two spaced arms-34, each adjacent one of the arms 8 and carried by a lever 35 pivoted at 35x on said appropriate arm 8, the projecting free end of each lever 35 being engaged by one of two springs 36 carried by said arm.

The printing mechanism, general

The printing mechanism broadly consists of an upper rotary printing head carrying the printing die assembly, a ribbon through which imprints are made, means for feeding and feed-reversing the ribbon, and means for moving the imprint faces of the die rings to change the imprint. A lower printing mechanism also is shown as constituting an added feature of the invention.

The upper printing mechanism

Projecting forwardly from standard 3 are two rigid arms 37 and each arm is apertured to receive a short hollow shaft 38 (Figure 6). These short shafts support the rotary die head.

The die head comprises two end disks 39, 39x, connected either integrally or otherwise by one or more longitudinal webs 39xx (Figure 7). The end disks carry between them an inking roller 40 supported by bracket arms 41 movable with a shaft 42 which is journaled in the end disks, one end passing through disk 39x and carrying a ribbon-reversing pawl shifter 43.

The ribbon 44 is carried over two spaced arcuate printing die plates 45 held between disks 39, 39x, and between the opposed edges of die plates are disposed a series of printing die rings generally indicated at 46. One end of the ribbon is carried on a spool shaft 47 and the other end

on a spool shaft 48, the latter shafts being journaled in the two end disks 39, 39x, and one end of each projecting exterior of disk 39x have fixed thereon a ratchet wheel 49 or 49x, as the case may be. The teeth of one of said ratchet wheels are directed reversely to the teeth of the other wheel.

The ribbon feed ratchet wheels 49, 49x, are alternately driven. The driving member is a pawl 50 pivoted at 51 on a slide pawl carrier 52 shown more particularly in Figure 9. The slide pawl carrier is held in position on disk 39x of the die head by an overlying plate 54 secured by screws 54x.

Disposed in spaced channels formed in die head disk 39x are springs 53, each spring engaging a pin 55 projected into the channel from slide pawl carrier 52 and tending to move the latter outwardly.

A spring 56 (Figure 9) carried by the carrier 52 is adapted to engage one of two angular faces on pawl 50 in either of the two active positions of the pawl to hold the same in such position until it is positively moved by the pawl shifter 43.

Operation of the ribbon-reversing mechanism

The ribbon-reversing pawl shifter 43 carries two pins 43x lying on opposite sides of the pawl. It also carries a stud 57 (Figure 8) adapted to be engaged by a "dead center throw" cam plate 58 which slides in a shallow recess cut in disk 39x. Like member 52, camplate 58 carries two spaced pins 59 (Figures 9, 10) which are engaged by springs 60 disposed each in a channelway cut in disk 39x. It will be seen that the pins 43x project through elongated apertures in the slide pawl-carrier 52 so that the latter may reciprocate without affecting the pawl-shifter.

In each rotation of the die head slide pawl carrier 52 will be given a bodily inward and outward movement the first by contact with lower feed roller 10 and the second by the action of springs 53. In such movement, pawl 50 will give a ribbon-feeding movement to the appropriate ratchet wheel 49 or 49x on its ribbon spool shaft. The inking roller 40 will be in contact with the convolutions of ribbon as they accumulate on the spool of said shaft and as the wound-in ribbon diameter increases, lever 43 will be gradually moved to dead center position, so that the reversely-tapered pointed end of cam 58 will be brought to the center of stud 57 on shifter 43. A slight further winding-in of the ribbon will enable the cam to be spring-pressed outwardly and thereby throw shifter 43 to complete reverse position, its pin moving the pawl to the second ratchet wheel 49 or 49x as the case may be.

The throw-in mechanism

As shown in Figure 3, arms 37 rise immediately from a cross member 37x secured by bolts 61 to standard 3. Held by a bracket 62 on cross member 37x is a solenoid 63 having its core plate 63x connected to an angle arm 64. The latter is connected by link 65 with a lever 66 pivoted at 66x on one of the arms 37. Lever 66 is connected by a link 67 with a latch arm 68 pivoted at 68x on said arm 37. The end of latch arm 68 is laterally bent to ride over upon the periphery of a disk 69 carried by the rotary die head and cut to form a latch shoulder at 69x (Figure 4) which is adapted to receive the end of the latch arm.

When the die head is inactive a cutaway section at C, Figure 4, surmounts the feed roller 10 out

of contact therewith and latch arm 68 engages latch shoulder 69x.

Pivoted on each of the arms 37 at 70 is an arm 71, the arms carrying between them a shaft 72 for a pressure roller 73, given pressure through springs 74 carried by arms 37, each connected to the rear end of one arm 71. Roller 73 is adapted to ride on lower roller 32. Both of these rollers 73, 32 are near each end thereof peripherally channeled and each channel receives the end 75x of one of two switch-throwing arms 75, each pivoted at 76 upon one of the arms 2x. These arms are connected by a cross bar 77 and the cross bar carries two spaced electrical contacts 78, 79.

Electrical contact 78 is adapted to engage a co-acting contact 80 to complete a circuit (not shown) through solenoid 63.

When a sheet is placed on plate 29, feed roller 18 will advance it between feed roller 20 and an overlying pressure roller 81 on a shaft 82 carried by angle lever 83 pivoted on casing arm 100 at 84, the end of the lever being engaged by a spring 85 on an adjusting stud 86 (Figure 1), the latter loosely passing through the aperture of a boss 87 on arm 37 and being threaded to receive an adjusting nut 88.

The sheet thus fed rearwardly will then pass between rollers 32 and 73 and in so doing will depress switch-throwing arms 75, thus bringing contact 80 into engagement with coacting contact 77. Thereupon the solenoid 63 will act to lift the printing head holding pawl 68 out of engagement with the head. When this is done a spring 89 (Figures 2 and 5) will impart a movement to a throw-in pawl-lever 90 which will bear upon a roller 91 carried by the die head and the latter will be given sufficient rotation to carry its bearing surface adjacent clearance *c* into engagement with lower feed roller 10 which will be followed by a complete rotation of the die head through the action of said feed roller. The release of the solenoid-operated pawl is but momentary and it will immediately drop down and its end will ride on the periphery of plate 69 as the die head makes its revolution. In completing such revolution, the roller will again lift pawl-lever 90, thus again putting spring 89 under tension and the end of pawl 68 will engage the die head shoulder 69 at the moment the pawl-lever is restored to its position shown in Figure 2, the clearance area *c* thence surmounting the lower feed roller 10. Returning to the upper die head, it has heretofore been set forth that the head carries a series of printing rings 46 as shown more particularly in Figure 6. These rings are mounted on a shaft 92 and each ring rigidly carries a pinion such as 93, Figure 7. Each ring may rotate on shaft 92 independently of the remaining rings. For such rotation each pinion 93 is in mesh with a pinion on a second shaft 94. The pinions on shaft 94 rotate independently of each other. In the drawings, eleven printing rings are shown and there are eleven pinions on shaft 92 and a corresponding number on shaft 94. Each one of the pinions on shaft 94 is in mesh with a pinion carried either by a shaft 95, Figure 6, or by a sleeve surrounding the shaft. In the present embodiment, the shaft 95 carries a thumb disk 96 and surrounding the shaft at one side of the die head are four sleeves, each sleeve carrying a thumb wheel, the thumb wheels being generally indicated at 97. At the opposite side of the die head shaft 95 is surrounded by an additional set of five concentric sleeves of successively different lengths, each sleeve having thereon a thumb

wheel, the thumb wheels being generally indicated at 98. Each of the two sets of sleeves carries within the die head a pinion, which pinion is in mesh with a pinion on 92 for one of the printing rings. Shaft 95 and its encircling sets of sleeves are supported in the hollow shafts 38 and hence rotate with the die head. By such means, each printing ring may be adjusted independently of all the other printing rings when the die head is at rest, to change the printing, as, for example, symbols or dates.

The underprinting mechanism

It has been heretofore described that the motor shaft carries a pinion 28 which drives a gear wheel 27 and that gear 27 drives a pinion on a shaft 9 carrying an underfeed roller 10. In the embodiment shown in Figures 1 and 2, the underprinting mechanism has not been applied. The underprinting mechanism however, has been illustrated in Figures 11 to 20 inclusive. As shown in said figures, shaft 9 has secured thereto by key 9x the feed roller 10.

Loosely mounted on shaft 9 at the end thereof adjacent pinion 26 is an underprinting die head 101 having a T-shaped peripheral recess which receives a printing member 102 which may carry type 103. A spring 104 may give yielding pressure to the printing member and the outward movement of the latter is limited by a pin 105 carried thereby (Figure 17) and movable within a slot at 106 cut in a disk 107 screwed to one side face of the die head 101. Disk 107 may be of the same diameter as the die head as indicated in Figure 17 or of slightly less diameter as shown in Figure 18.

Screwed to hub 101x is a disk 108 peripherally cut to form a latching shoulder 109 (Figures 18, 19, 20). The die head is formed longitudinally with a clearance channel at *Cx* so as to clear the upper die head when latched.

The latching means consists of a latch arm 110 pivoted at 111 on bracket arm 8 and at its lower end connected by link 112 with a lever 113 which is pivoted at 114 on bracket arm 8. The lower end of lever 113 is connected by pivot pin 115 with the core rod 116 of a solenoid 117, the rod carrying a head 116x.

When the latch arm 110 is released by the solenoid a pusher imparts to the underprinting die head 101 a partial rotation to move an area thereof adjacent the clearance channel *Cx* into bearing relation with the upper die head after it is given a partial rotation by its own pusher mechanism. For this purpose the die head adjacent disk 108 carries a push-receiving stud 118. Pivoted at 119 on arm 8 is a pusher arm 120, its depending lower end being engaged by a spring 121 secured at one end to the solenoid housing 117. When the latch arm 110 is thrown to release position by the solenoid, spring 121 will cause pusher arm 120 to bear upon stud 118 and the underprinting die head will be given a partial rotation, thus carrying its periphery adjacent clearance channel *Cx* into engagement with the upper die head which, in the meantime, has been moved by its own pusher member. The lower die head will thus be frictionally rotated and complete the revolution. At the end of that revolution the latching arm will again engage shoulder 109 and the stud 118 will have sunk the pusher against tension of spring 121 to be ready for a succeeding pusher action; also the clearance channel *Cx* will again lie opposite the upper die head.

The solenoid 117 will be electrically connected with contact 79 on cross bar 77 and a normally spaced contact 79x, Figure 14. It has heretofore been explained that cross bar 77 is actuated through depression of the fingers 75x, Figure 3, by a sheet passing between rollers 32 and 72.

Ink is applied to the lower printing die by an inking roller 122 pivoted on a shaft at 123 carried by a pair of arms 124, one of which is shown in each of Figures 16 and 20. These arms are carried by a slide bar 125 slidable in a channelway member at 126, Figure 16. Slide bar 125 has an upwardly bent arm 125x apertured to receive an adjusting screw 127. By rotating the screw the slide bar may be moved inwardly to cause the connecting roller to press upon the lower die head.

The motor shaft may have applied thereto a governing disk 128 carrying a contact plate 129 having a contact 129x, the plate being adjustable by a screw stud 130 on the bracket 131 (Figure 16). The second contact is indicated at 132 carried by a light spring arm 133. Thus when the speed of the motor is in excess of a desired maximum, centrifugal force on arm 133 will swing it out and separate the contacts 129x, 132, to break the circuit through the motor. A curved cover plate 134 may be applied to the front of arms 130 and a swinging cover 135 pivoted at 136 on standard 3 may be used to cover the die head and its immediately associated elements.

Having described my invention, what I claim and desire to secure by Letters Patent, is as follows:

1. An automatic rotary check endorser comprising a rotary printing head, sheet supporting means adjacent said head, a plurality of sheet feeding rolls adjacent to the sheet supporting means, a supporting frame for the sheet supporting means, a movable support for said feed rolls, and means for adjusting said movable support to bodily move the feed rolls relatively to the rotary printing head.

2. An automatic rotary check endorser comprising a rotary printing head, sheet supporting means adjacent said head, a plurality of sheet feeding rolls adjacent to the sheet supporting means, a supporting frame for the sheet supporting means, a pivoted support for said feed rolls, and means for swinging said pivoted support to bodily move the feed rolls relatively to the rotary printing head.

3. An automatic rotary check endorser comprising a frame member, a rocking frame pivoted to said frame member, a plurality of sheet feeding rolls carried by said rocking frame, means for rocking the frame to bodily move the sheet feeding rolls, means for rotating the sheet feeding rolls, a rotary printing head disposed above the sheet feeding rolls, and means for rotating said printing head.

4. An automatic rotary check endorser comprising a frame member, a plurality of sheet feeding rolls, a rocking frame carrying said rolls and pivoted to the first-named frame member, an arm depending from the rocking frame, an adjusting rod connected to the arm, and means for imparting endwise movements to the rod for adjusting the rocking frame.

5. An automatic check endorser comprising a rotary printing member, a rotary driving member adapted to impart rotational movement to the printing head, a cut away area in one of said members serving as means for holding them

out of mutual engagement until rotation of the printing head is desired, sheet supporting means for guiding a sheet to said head, an electrical actuator, means adapted to effect the energizing of said electrical actuator, a spring pressure device adapted to be engaged by the rotary driving member and moved to exert tension on its spring as the printing head completes a rotation, a latch engaging the printing head upon the completion of its rotation, and operative connections between the said actuator and the latch for releasing the latter, causing the spring pressure device to effect a partial rotation of the printing head to bring the same and the rotary driving member into mutual engagement for effecting a complete rotation of the printing head.

6. An automatic check endorser comprising a rotary printing member, a rotary driving member adapted to impart rotational movement to the printing head, a cut away area in one of said members serving as means for holding them out of mutual engagement until rotation of the printing head is desired, sheet supporting means for guiding a sheet to said head, an electrical actuator, means adapted to effect the energizing of said electrical actuator, a spring engaged pawl lever adapted to be engaged by the rotary driving member and moved to exert tension on its spring as the printing head completes a rotation, a latch engaging the printing head upon the completion of its rotation, and operative connections between the said actuator and the latch for releasing the latter, causing the spring engaged pawl to effect a partial rotation of the printing head for mutual engagement of the latter and the rotary driving member.

7. An automatic rotary check endorser comprising an upper rotary printing head, sheet supporting means adjacent said head, a rotary driving member adapted to impart rotational movement to the printing head, means for holding the printing head out of operative relation with said rotary driving member and for releasing the holding means, including an electrical actuator, means adapted to effect energizing of said electrical actuator, means adapted thereupon to throw the rotary driving member and said head into operative relation, a lower rotary printing head adapted to be driven by the upper rotary printing head, and electrically controlled means for throwing the upper and lower printing heads into operative relation preliminary to the feeding of a sheet therebetween.

8. In automatic check endorsers including a rotary printing head and driving means therefor, of means for controlling rotation of the said head, comprising a latch adapted to engage the head, a solenoid operatively connected to the latch, a spring impulse member adapted to be thrown into operative position upon each rotation of and by the rotary printing head, the pawl and spring impulse member being synchronized as to time of action so that the rotary printing head is latched by the pawl after the spring impulse member reaches operative position, and a switch device connected to the solenoid for closing a circuit therethrough by the action of a sheet in the passage of the latter of the latter to the rotary printing head whereby the pawl is released and the printing head is given a partial rotation by the spring impulse member to carry it into engagement with the driving means.