

Feb. 24, 1953

J. HANDLEY

2,629,319

TICKET PRINTING AND ISSUING MACHINE

Filed May 31, 1946

7 Sheets-Sheet 1

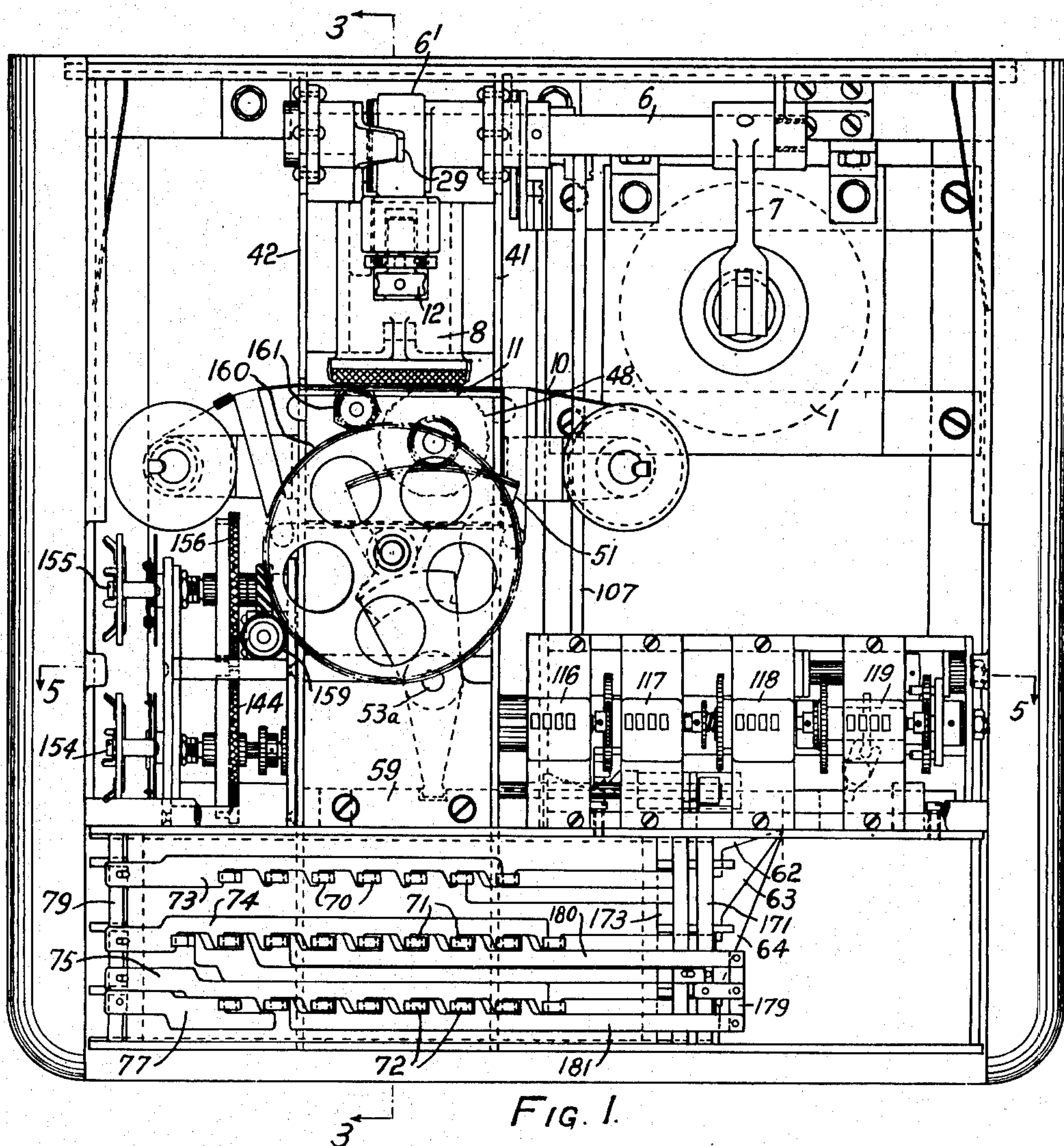


FIG. 1.

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TICKET PRINTING AND ISSUING MACHINE

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7 Sheets-Sheet 2

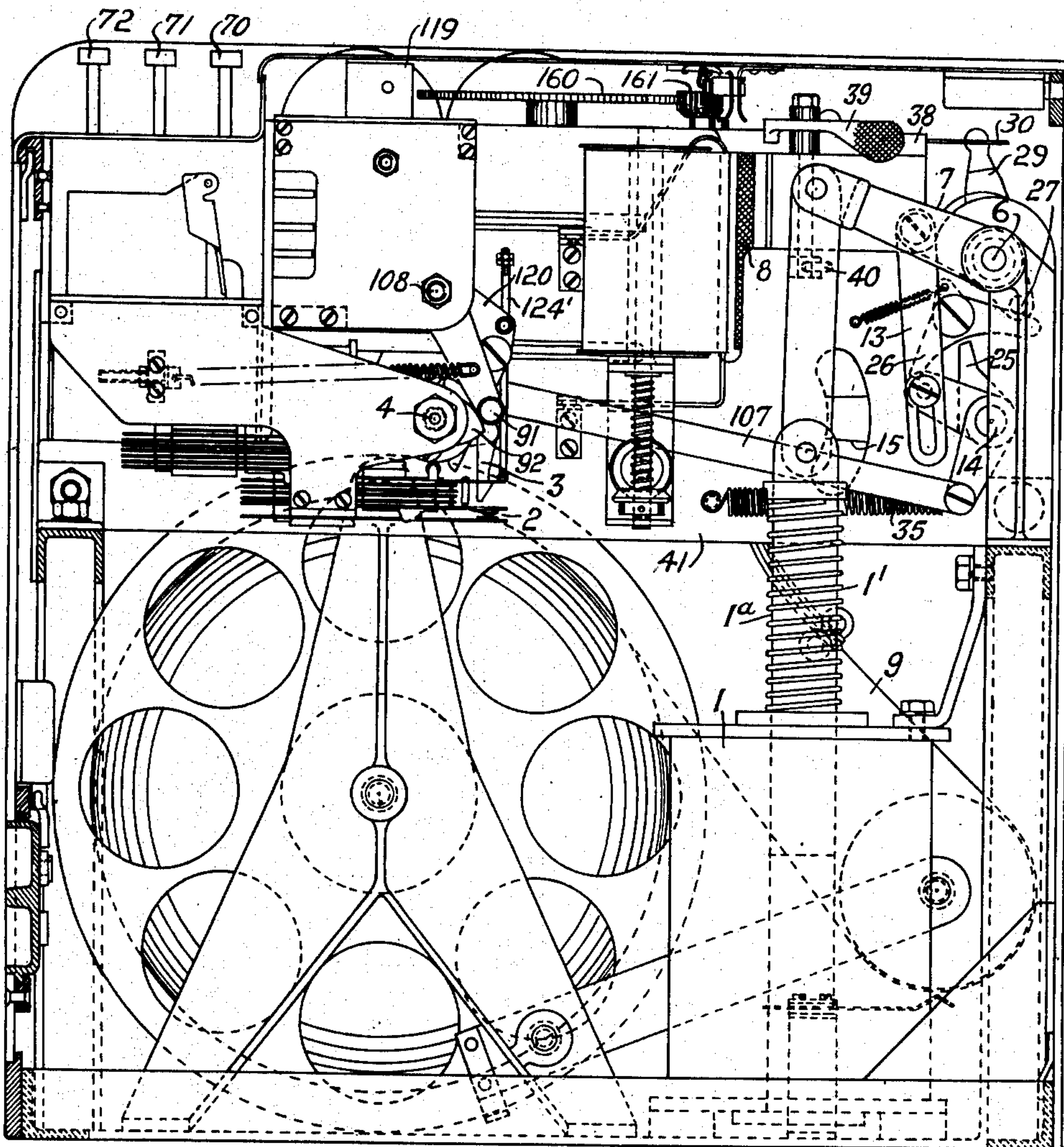


FIG. 2.

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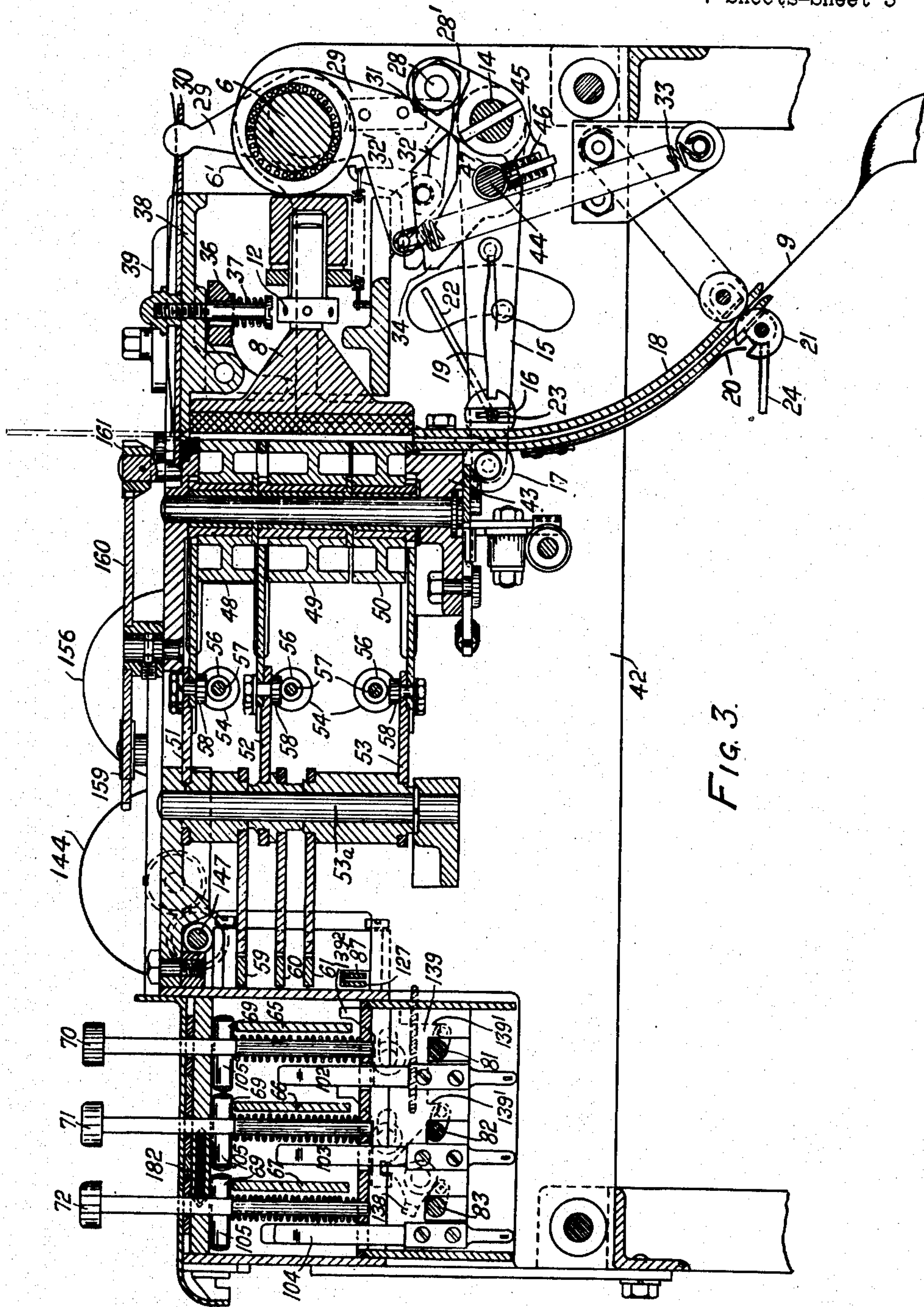
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2,629,319

TICKET PRINTING AND ISSUING MACHINE

Filed May 31, 1946

7 Sheets-Sheet 3



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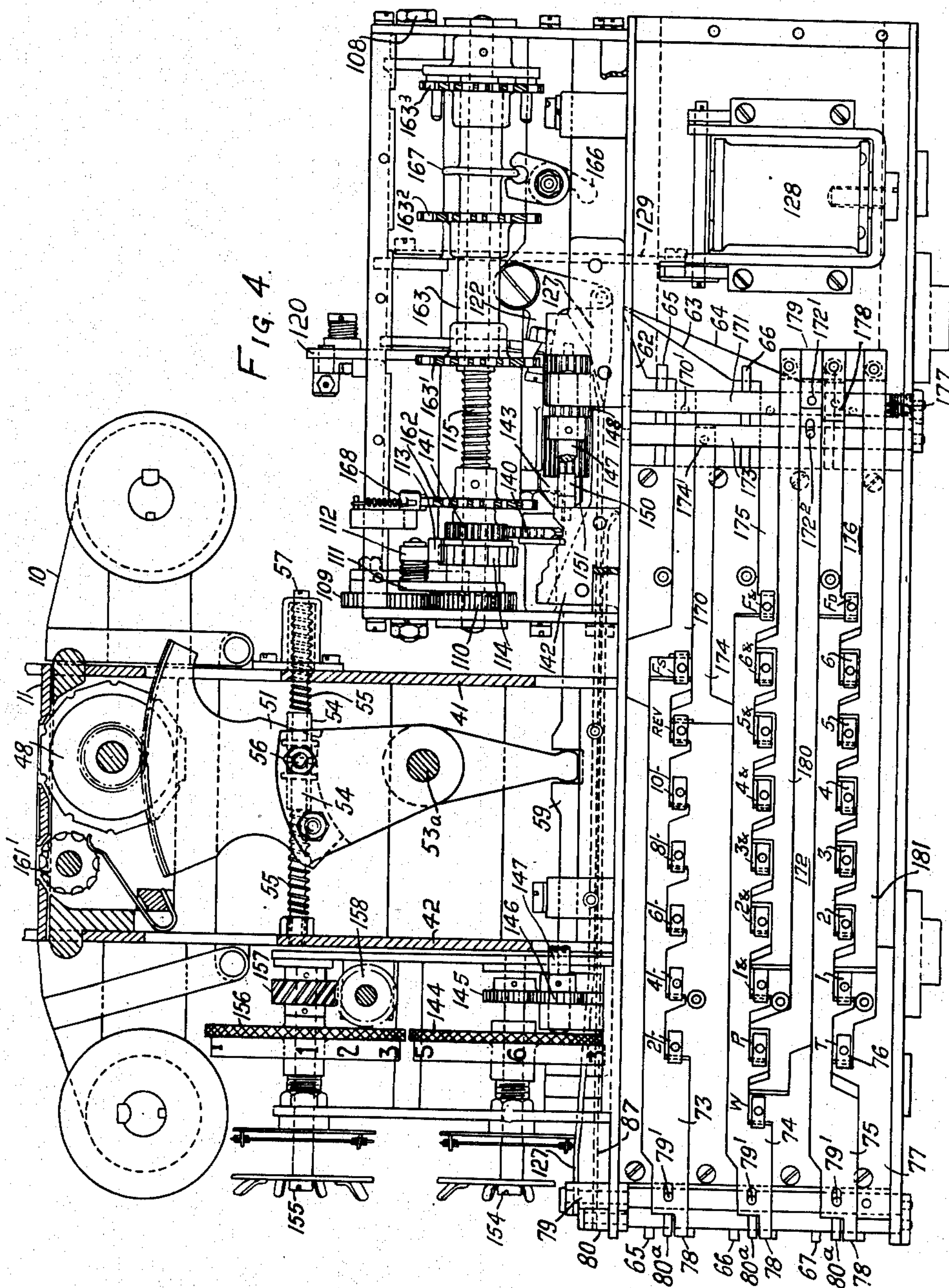
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2,629,319

TICKET PRINTING AND ISSUING MACHINE

Filed May 31, 1946

7 Sheets-Sheet 4



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**Feb. 24, 1953**

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**2,629,319**

TICKET PRINTING AND ISSUING MACHINE

Filed May 31, 1946

7 Sheets-Sheet 5

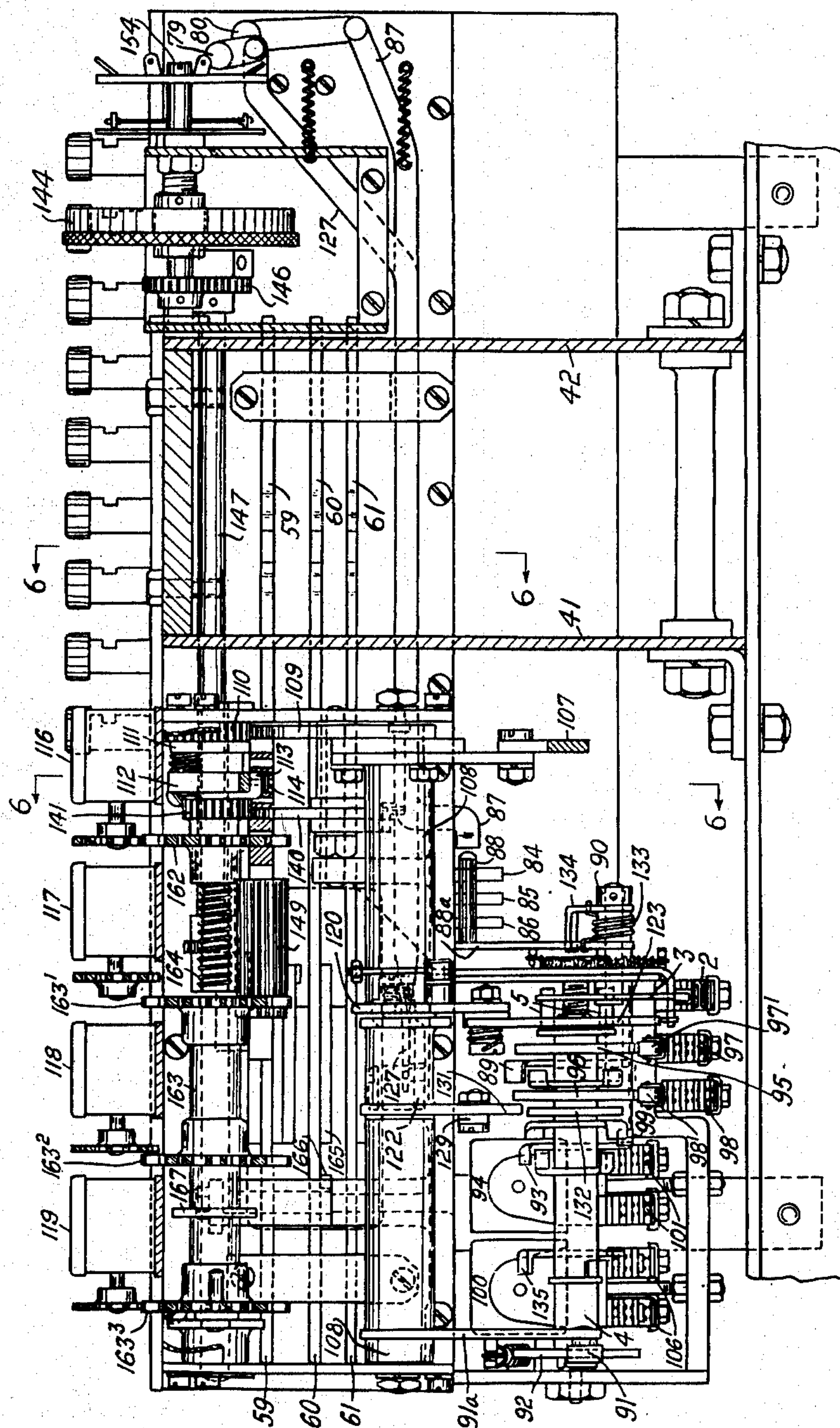


FIG. 5

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TICKET PRINTING AND ISSUING MACHINE

Filed May 31, 1946

7 Sheets-Sheet 6

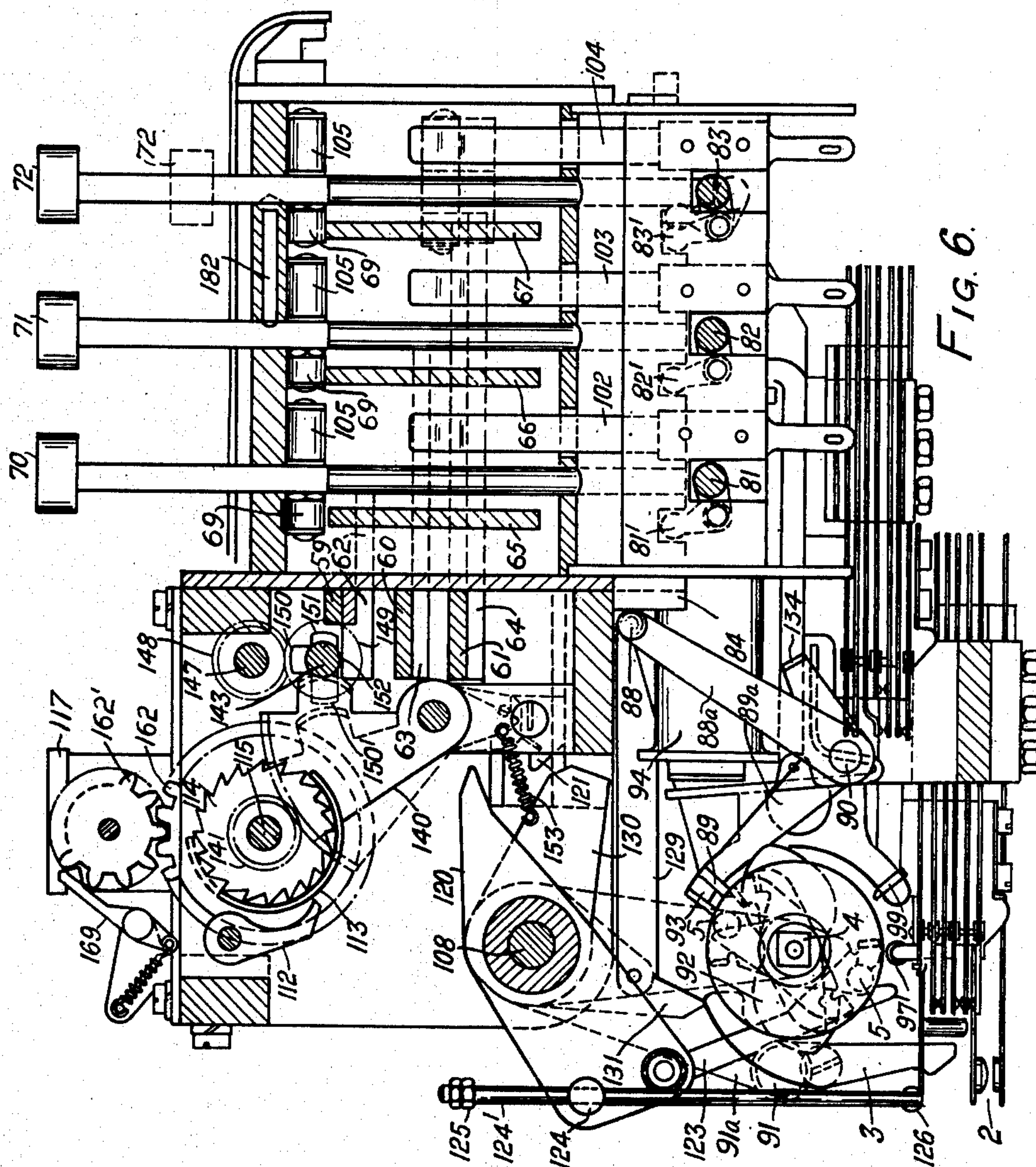


Fig. 6.

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Feb. 24, 1953

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2,629,319

TICKET PRINTING AND ISSUING MACHINE

Filed May 31, 1946

7 Sheets-Sheet 7

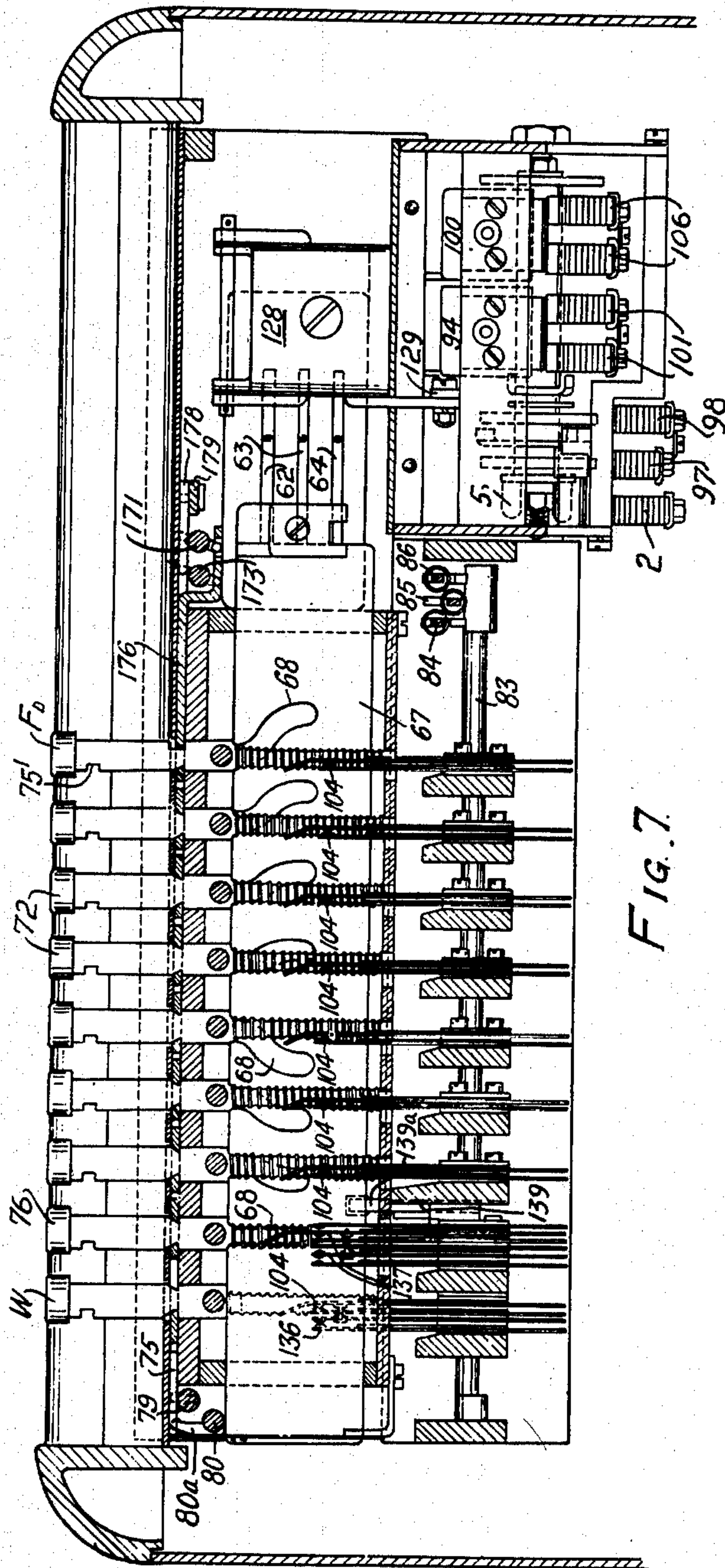


FIG. 7

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## UNITED STATES PATENT OFFICE

2,629,319

## TICKET PRINTING AND ISSUING MACHINE

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Union Totalisator Company Limited, Glasgow,  
Scotland, a company of Great Britain

Application May 31, 1946, Serial No. 673,353  
In Great Britain May 5, 1944

7 Claims. (Cl. 101-66)

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This invention relates to improvements in ticket printing and issuing machines suitable for use with totalisators.

In a machine according to the invention ticket printing, issuing and guillotining mechanisms derive their actuation from mechanism brought into action by energization of a solenoid.

The printing mechanism includes type wheels directly positioned by the depression of selecting keys which engage slots or cam-tracks in traversing mechanism geared to the type wheels.

As will appear from what follows, the machine is contrived to issue tickets for Win and Place and Forecast betting, which includes Reverse bets and Field bets on the Forecast Pool.

A practical embodiment of the invention is illustrated in the accompanying drawings, in which Fig. 1 shows the machine with the front cover and other parts removed, Fig. 2 shows the machine with the cover removed from the right hand side, Fig. 3 is a section through 3-3 in Fig. 1, Fig. 4 is a section through the front of the machine immediately behind the counters, Fig. 5 is a section through 5-5 in Fig. 1, Fig. 6 is a combination of sections 6-6 in Fig. 5, and Fig. 7 is a part view of the underside of the machine with the bottom cover removed.

In the drawings, (Figs. 2, 5 and 6) 1 denotes a solenoid having a plunger 1<sup>a</sup> retraction of which is resisted by a spring 1'. The solenoid is controlled by a contact switch 2 adapted to be held open normally by a pawl 3 controlled by a contactor rotor or spindle 4 which carries two pins 5 adapted to engage the pawl 3 and release the contacts 2.

The plunger 1<sup>a</sup> is in operative connection with an eccentric shaft 6 (Figs. 1 and 2) through a link 7. An eccentric 6' (Figs. 2 and 3) fixed on the shaft 6 is adapted to act on a platen 8 arranged to thrust a strip 9 of paper against an inking ribbon 10 and a type plate 11. A screw 12 is provided whereby the pressure exerted by the platen 8 on the ribbon 10 and type plate 11 may be adjusted.

The shaft 6 is connected by a link 13 (Fig. 2) to an arm on a paper feed shaft 14 (Fig. 3) which carries an arm 15 furnished with a knurled eccentric roller 16 and a smooth roller 17 adapted to follow the arc of a curved guide 18. A spring 19 urges the roller 16 towards the paper strip 9.

A spring 20 urges another knurled eccentric roller 21 towards the paper strip 9.

A lever 22 attached to the shaft 23 of the roller 16 allows the roller 16 to be turned back manually against the spring 19, thereby freeing the paper.

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Similarly, the roller 21 may be turned back against the spring 20 by a lever 24 (Fig. 3).

An arm 25 (Fig. 2) on the shaft 14 is adapted to be latched against a pawl 26 when the shaft 14 is rotated by operation of the solenoid 1. A pin 27 is arranged to trip the pawl 26 on the return stroke of the plunger 1<sup>a</sup>, thereby releasing the arm 25 and the paper feed shaft 14.

A pin 28 (Fig. 3) mounted on an arm 28' fixed to the shaft 14 is adapted to rock a guillotine lever 29 on counter-clockwise rotation of the shaft 14 whereby to retract a guillotine blade 30. A tooth 31 on the lever 29 is adapted to be engaged by a pawl 32 on a bell-crank 32' whereby the guillotine blade 30 is held open against the pull of a spring 33. A lost-motion lever 34 attached loosely to the shaft 14 and the arm 15 is adapted to trip the bell-crank 32', whereby the guillotine blade 30 may be thrust forwardly by the spring 33 so as to cut the paper strip.

The arm 15 is urged in clockwise direction, as viewed in Fig. 3, by a spring 35 (Fig. 2). A rocker 36 (Fig. 3) urged by a spring 37 is adapted to raise the platen 8 when the shaft 6 has returned to its initial position.

A frame 38 supporting the guillotine blade 30 is arranged for easy removal to clear a paper jam by the manipulation of finger levers 39 arranged to withdraw pawls 40 from slots in side plates 41 and 42 (Figs. 1 and 2).

To ensure that the paper strip 9 is at rest before the guillotine operates, the arm 15 is adapted to come to rest against a block 43 (Fig. 3) before a pin 44 on the lost-motion lever 34 can, under the influence of a plunger 45 and a spring 46, take up the clearance provided in a hole 47, thereby releasing the pawl 32 on the bell-crank 32' which allows the guillotine blade 30 to function.

Three type wheels 48, 49 and 50 are provided to print particulars of the betting transactions. The wheel 48 is adapted to print the "stake," the wheel 49 is adapted to print the "win" or "place" competitor numbers or the 1st competitor forecast or the field for 1st place, and the wheel 50 is adapted to print the "win" or "place" competitor numbers or the 2nd competitor forecast or the field for 2nd place.

The type wheels 48, 49 and 50 are adapted to rotate up to 180° in clockwise or counter-clockwise direction under the influence of toothed sectors 51, 52 and 53, respectively, meshing with pinions on the type wheels (Fig. 3).

The type wheels and sectors are assisted to return to their normal positions by centralising



collars 54 (Fig. 4) urged by springs 55 towards fixed collars 56 on shafts 57. The centralising collars 54 bear against screw heads 58 (Fig. 3) attached to the sectors 51, 52 and 53. This centralising mechanism is also intended to take up back lash in the movable parts. In the normal position the type wheels are so arranged that they are set for printing the word "Test."

Lever extensions of the sectors 51, 52 and 53 engage slots in slidable bars 59, 60 and 61, respectively, connected by fingers 62, 63 and 64 to control plates 65, 66 and 67, respectively (Figs. 3 and 4).

Curved cam slots 68 (Fig. 7) cut in the control plates 65, 66 and 67 are engageable by rollers 69 borne by "stake" keys 70, 1st selection keys 71 and 2nd selection keys 72, adapted to be depressed in opposition to springs (Fig. 3). The control plates 65, 66 and 67 will thus be moved by fixed amounts to right or left depending on the pitch of the curved slot opposite each key. In this way the type wheels are positioned to print the selections called for.

Any stake key 70 is adapted to be locked down by a locking bar 73; any 1st selection key 71 is adapted to be locked down by a locking bar 74; and any 2nd selection key 72 is adapted to be locked down by a locking bar 75 (Fig. 4). This locking is effected by the locking bars engaging slots 75' (Fig. 7) formed in the keys 70, 71 and 72.

76 (Fig. 4) is a test key adapted to lock the control bars in their normal position ready to print a test ticket. The key 76 is itself adapted to be locked down by a control bar 77 arranged to engage a slot in the key 76 as for the other keys. Leaf springs 78 urge the locking bars 73, 74 and 75 into the slots 75' in the keys 70, 71 and 72.

A cancel rocker shaft 79 (Figs. 4 and 7) is adapted to pull the locking bars 73, 74 and 75 out of the slots 75' in the depressed keys by means of pins 79' engaging slots in said locking bars, whereby the depressed keys are freed to return to their initial positions.

A check bar shaft 80 (Fig. 4) carries three fingers 80a, of which one finger bears on the end of the locking bar 73, one finger bears on the end of the locking bar 74 and the third finger bears on the end of the locking bar 75. All three locking bars must each have moved longitudinally to lock a key down before the check bar shaft 80 can turn.

To ensure that one key in each row is fully depressed and locked down, three engagement bars 81, 82 and 83 (Fig. 6) are each adapted to be depressed by keys 70, 71 and 72, respectively, when their stroke is almost completed. The engagement bars 81, 82 and 83 are adapted to withdraw release bars 84, 85 and 86, respectively, by means of bell-cranks 81', 82' and 83'. A lock check bar 87 (Fig. 5) connected to the check bar shaft 80 lies adjacent to the release bars 84, 85 and 86, so that a pin 88 on an arm 88a operatively connected to a tooth 89 on an arm 89a by a rocker shaft 90 to which the arms are attached (Fig. 6) can drop and lift the tooth 89 only when the three release bars 84, 85 and 86 and the lock check bar 87 are withdrawn, and this can only happen when a key in each row is depressed to the full extent of its stroke.

A spring-urged roller 91 (Figs. 5 and 6) mounted on an arm 91a is adapted to press against a cam 92 fixed to the contactor rotor 4 and thus urge it to rotate. Continuous rotation of the rotor 4 is prevented by a tooth 93 controlled by

an operating relay 94. Cams 95 and 96 mounted on the rotor 4 are adapted to close contacts 97 and 98 by means of rollers 97' and 98'. These contacts are so contrived that the contact 97 signals control apparatus referred to in U. S. patent application Serial No. 553,009, now Patent No. 2,479,681, to send the bet, and the contact 98 prepares circuits to a check relay 100 (Fig. 5) which is adapted to operate when the bet is accepted. A tooth 99 carried by the same mounting as the tooth 93 and operated by the relay 94 is also adapted to restrain the contactor rotor 4 from further rotation in a more advanced position than that occupied by the tooth 93.

The relay 94, in addition to controlling the tooth 93, is also adapted to close contacts 101 which connect a source of electric power to contacts 102, 103 and 104 adapted to be closed by insulated rollers 105 attached to the keys 70, 71 and 72 (Fig. 3). The contacts 102, 103 and 104 are connected to control apparatus adapted to operate appropriate counters in the remote control station and register the bet. The counters are arranged to complete a circuit to the check relay 100 by way of contacts 106 (Fig. 5).

A link 107 (Fig. 2) is operatively connected at one end to an arm on the paper feed shaft 14 and at the other end to an arm on a control rocker shaft 108 (Fig. 6). A toothed segment 109 (Figs. 4 and 5) attached to the shaft 108 is arranged to mesh with a pinion 110 bearing an arm 111 furnished with a pawl 112 at the end remote from the pinion. The pawl 112 is separated by a movable shroud 113 from a ratchet wheel 114 fixed on a counter drive shaft 115 (Fig. 6) adapted to be put in operative connection with a "total" counter 116, and with a "win" counter 117, or a "place" counter 118, or a "forecast" counter 119 (Figs. 1 and 5), said counters being responsive to movements of bet-sending keys.

A rocker plate 120 (Fig. 6) is mounted rigidly on the shaft 108 and is adapted to pass over a trip pawl 121 attached to a cancel rocker 122 (Fig. 4). The other end of the plate 120 carries a set-up pawl 123 (Fig. 6) contrived to engage one of the two pins 5 on the contactor rotor 4 when the set-up pawl is lifted by the plate 120. A boss 124 also mounted on the plate 120 is adapted to slide along a rod 124' furnished at its free end with nuts 125 acting as a stop. The other end of the rod 124' is attached to an operating spring 126 adapted to urge the solenoid switch 2 to close. In the normal position the spring 126 is arranged to be held up by the pawl 3 whereby the contacts 2 remain open against the action of the spring 126.

A cancel link 127 (Fig. 5) connects the rocker 122 and the rocker shaft 79, whereby movement of the rocker 122 will withdraw the locking bars 73, 74 and 75 and release the operated keys.

A cancel magnet 128 (Fig. 4) is coupled by a link 129 to a rocker 130 (Fig. 6) on shaft 108 also in operative connection with the rocker 122. The magnet 128 is so governed by control apparatus that depression of a key pertaining to a competitor which has been withdrawn is arranged to actuate the magnet 128, resulting in the keys being returned to the pre-set condition by the operation of the rocker 130 and the rocker 122. At the same time an arm 131 on the rocker 130 is adapted to engage a dog 132 on the contactor rotor, whereby the said rotor is rotated to its original position. A spring 133 and an arm 134 (Fig. 5) are attached to the rocker shaft 90



in such a way that, when the magnet 128 operates, rotating the contactor rotor, the tooth 89 attached to the shaft 90 may be thrust clear of the contactor rotor even though the pin 88 is still held up by the release bars 84, 85 and/or 86. The magnet 128 may also be arranged for manual operation by a switch in a control room. To provide against any fault which might prevent the counters from registering a bet, the control apparatus is so contrived that the relay 100 will stop the contactor rotor from completing its rotation by interposing a tooth 135 (Fig. 5) in the path of a dog (not shown) on the rotor 4.

An additional pair of contacts 136 (Fig. 7) is provided for operation by the "win" and the "place" keys. Electrical connections are so arranged that operation of either of these two keys can complete electrical circuits to a set of change-over relays, adapted to disconnect the machine from the common wiring of forecast equipment and connect the machine to the common wiring of "win" and "place" equipment, as explained in U. S. patent application Serial No. 553,009.

Two change-over contacts 137 (Fig. 7) arranged for operation by the test key are adapted to disconnect the check signal wires from the control equipment and energise the relay 100, thereby allowing a test ticket to be printed without the usual check signal from the control equipment.

When the test key 76 is depressed, it is adapted to actuate a rocker 138 (Fig. 3) which is in turn adapted to depress the engagement bar 83 and displace a test control plate 139. Lobes 139' formed in said control plate 139 are adapted to depress the other engagement bars 81 and 82 when the plate 139 is displaced. At the same time projections 139<sup>2</sup> on the plate 139 are arranged to engage the control plates 65 and 66 and thus lock them against movement. The control plate 67 will be locked at the same time by the engagement of the roller 69 with the straight slot 68 in the plate 67 (Fig. 7).

The shroud 113 (Fig. 6) partly surrounding the ratchet wheel 114 is adapted to be moved by a toothed sector 140 meshing with a pinion 141 attached to the shroud. The sector 140 bears on a stake cam plate 142 (Fig. 4) attached to the slidable bar 59 controlled by the stake keys 70. The stake cam plate is provided with parallel steps, each step corresponding to an advance of one betting unit over the last step. The dimensions of the steps are such that, when the sector 140 bears against any particular step, the shroud 113 actuated by the sector will be uncovering an appropriate number of teeth on the ratchet wheel 114 for engagement by the pawl 112.

The reverse key "REV" is adapted to shift the slidable bar 59 by an amount corresponding to the number of money units involved.

The field stake key "Fs" is adapted to move the slidable bar 59 to the left when viewed as in Fig. 4 until the sector 140 bears on a "field" cam 143 which is arranged to move the sector a distance corresponding to the money transaction involved.

A thumb wheel 144 (Fig. 4) is provided to make adjustments in the stakes if competitors are withdrawn from the field. The wheel 144 is mounted on a common shaft with a pinion 145 which meshes with another pinion 146 on one end of a shaft 147. The shaft 147 carries at its other end a pinion 148 meshing with a

pinion 149 (Fig. 6) mounted on the same shaft as the cam 143. Rotation of the wheel 144 till the number of competitors actually taking part in a particular race is displayed on the wheel will thus rotate the cam 143 to the appropriate position, resulting in the shroud 113 being positioned so that the pawl 112 can only move the ratchet wheel 114 by the correct amount. The cam 143 has four lobes 150', 150, 151 and 152 corresponding to six runners, five runners, four runners, and three runners, respectively. A spring 153 (Fig. 6) is provided to urge the sector 140 towards the cam 143.

A connection is provided from the control room to every terminal on a rotary switch 154 mounted on the same shaft as the wheel 144 and adapted to energise a control relay in the control room only if the wheel 144 is set for the correct number of competitors. The control relay in the control room can then energise the operating relay 94 (Fig. 5) by circuits provided. Current for the control relay is arranged to pass to the control relay via a rotary race control switch 155 on the same shaft as, and operated by, a race control wheel 156. The wheel 156 is also connected through skew gears 157, 158 and pinions 159, 160 and 161 (Fig. 3) to a race number type wheel 161', (Fig. 4) whereby the correct race number will be printed on the ticket.

A pinion 162 (Fig. 5) rigidly attached to the counter drive shaft 115 is arranged to be continuously in mesh with a pinion 162' on the shaft of the counter 116 so that a total of all of the transactions made by the machine may be registered. A sleeve 163 furnished with three pinions 163', 163<sup>2</sup> and 163<sup>3</sup> is splined on the counter drive shaft 115. The three pinions are positioned so that lateral movement of the sleeve 163 will cause one of the three counters 117, 118 and 119 to be put in operative connection with the shaft 115. A spring 164 bearing on the end of the sleeve 163 tends to keep the forecast counter 119 in operative connection with the shaft 115.

The slidable bar 60 connected to the "place" key P by elements 63 and 66 is furnished with a plate 165 adapted to engage a toggle 166 (Figs. 4 and 5) in engagement with a collar 167 on the sleeve 163. The plate 165 is so positioned on the bar 60, which is in operative connection with the "place" key through plate 66, that depression of the "place" key will result in lateral movement of the sleeve 163 against the spring 164 sufficient to take the pinion 163<sup>3</sup> out of engagement with the forecast counter 119 and to put the "place" counter 118 in connection with the pinion 163<sup>2</sup>. Similarly, depression of the "win" key W is adapted to move the bar 60 a greater distance, resulting in the "win" counter 117 being engaged. The total counter 116 remains continuously in mesh irrespective of what other counter is being used. To ensure that the teeth on the pinions on the counter drive shaft 115 and the teeth on the pinions driving the counters are always in correct relationship for engagement, a corrector 168 (Fig. 4) is adapted to engage the pinion 162, and also governs the pinion 163', 163<sup>2</sup>, 163<sup>3</sup> since they are on the common sleeve 163 splined to the same shaft 115 as the pinion 162. Detents 169 (Fig. 6) engage the pinions on the counters 117, 118 and 119.

To prevent faulty operation of the machine, check bars are provided to prevent operation of certain keys when certain other keys have been depressed. A field stake check bar 170



(Fig. 4) adapted for operation by the "field" stake key F's is arranged to engage a pin 170' under the "field" check shaft 171. A "win" or "place" check bar 172 is adapted to engage a pin 172' on the top of the shaft 171, whereby, when the "win" or "place" key is depressed, the shaft 171 is held in such a position as to prevent movement of the bar 170, thus locking the "field" stake key F's in inoperative position.

The "win" and "place" check bar 172 also engages a pin 172<sup>2</sup> over a reverse check shaft 173, so that a reverse check bar 174 in engagement with a pin 174' under the shaft 173 is prevented from moving when the "win" or "place" key is down, thereby locking the reverse key REV in inoperative position. Similarly, operation of the key F's or the Reverse key REV will lock the win or the place key.

A field for first place lock bar 175 (Fig. 4) and a field for second place lock bar 176 are not bevelled off where they engage the keys F& and Fd, respectively (see Fig. 7), and are normally urged into engagement with these keys by a spring 177 (Fig. 4) on the shaft 171. The keys F& and Fd will thus remain permanently locked except when the key F's is operated whereby the shaft 171 will be rotated by the bar 170 against the spring 177, and the bars 175 and 176 will be withdrawn.

To ensure that, when the "field" stake key F's is operated, one or other of the keys F& and Fd is also operated, a link 178 is contrived to be moved towards the keys by movement of the shaft 171 resulting from the depression of the key F's. This movement of the shaft 171 is also arranged to carry towards the keys a lever 179, a first competitor check bar 180, and a second competitor check bar 181 (Fig. 4). Thus, if any key 1& to 6& were to be depressed, all of the second competitor keys 1 to 6 would be locked and only Fd would be free to operate, by movement of the bar 180, the lever 179 and the bar 181. Similarly, depression of any key 1 to 6 would lock all of the keys 1& to 6&, leaving only F& free.

To prevent the calling of the same competitor number for both first and second place, pins 182 (Fig. 6) are provided between keys 1& and 1, 2& and 2 and so on up to and including keys 6& and 6. The pins 182 are coned at each end, the coned parts being engageable with depressions in the keys. The pins are made of such a length that when a pin is clear of one key the key at the other end is engaged and is thus prevented from being operated.

In operation, the thumb wheel 156 (Fig. 4) is set for the correct race number. This sets the type wheel 161 through the skew gears 157 and 158 and the pinions 159, 160 and 161, and also sends a signal to the control apparatus by the rotary switch 155.

The wheel 144 is set for the number of competitors known to be actually taking part in the race. This sends a signal to the control apparatus by the rotary switch 154 and also, by means of the pinions 145 and 146, the shaft 147 and the pinions 148 and 149, rotates the cam 143 to the appropriate position for the number of competitors, to prepare for possible operation of the "field" stake key F's.

A stake key, a first selection key and a second selection key are then depressed to place a bet. Each key completes a circuit to the control apparatus by means of contacts 102, 103, and 104. At the same time depression of the key forces

the rollers 69 into the slots 68 in the control plates 65, 66 and 67, causing the plates to move to one side or the other, moving the bars 59, 60 and 61 by the fingers 62, 63 and 64. Movement of the bars moves the sectors 51, 52 and 53, rotating the type wheels 48, 49 and 50 to a position where they are ready to print particulars of the transaction shown on the depressed keys.

When the bar 59 moves, the stake cam plate 142 attached to it rotates the sector 140 which moves the shroud 113 around the ratchet wheel 114, so that the pawl 112 when actuated will engage the ratchet wheel 114 at the correct point to move the counters the correct number of units. Alternatively, when the "field" stake key F's is depressed, the bar 59 moves the "field" cam 143 under the sector 140; the cam 143 then moves the sector and shroud the appropriate distance, as before.

Depression of the keys also withdraws the release bars 84, 85 and 86 by means of the engagement bars 81, 82 and 83. When the keys are properly locked down, the locking bars 73, 74 and 75 moving into slots in the depressed keys to lock them down and take with them the three fingers 80a mounted on the check bar shaft 80 and by rotation of this shaft withdraw the lock check bar 87, permitting the pin 88 to drop and lift the tooth 89 out of the engagement with the contactor rotor.

The roller 91 bearing on the cam 92 mounted on the contactor rotor 4 forces the rotor to rotate until checked by the tooth 93 of the relay 94. At this point the cam 95 closes the contacts 97, thus signalling the control apparatus to send the bet, and the cam 96 closes the contacts 98 preparing circuits to the check relay 100.

When the control apparatus is ready to send the bet, the relay 94 is energised, withdrawing the tooth 93 from engagement with the contactor rotor and allowing the rotor to rotate until it is held again on the tooth 99. When the relay 94 operates, it also closes the contacts 101 to energise the circuits to the remote control apparatus already described through the contacts 102, 103 and 104. The appropriate counters in the remote control apparatus now operate to register the bet and send back an impulse to the check relay 100 via the contacts 106. The check relay 100 now operates and releases the relay 94 so that the contactor rotor rotates to its final position, tripping the pawl 3 by one of the pins 5, thus allowing the contacts 2 to close, and energising the solenoid 1.

The solenoid 1 rotates the shaft 6 by the link 7 and the cam 6' on the shaft 6 and forces the platen 8 down on the paper strip 9, the inking ribbon 10, the type plate 11 and the type wheels 48, 49, 50 and 161' to print the ticket.

While the shaft 6 is rotating, the link 12 is rotating the shaft 14 so that the arms 15 swing in counter-clockwise direction when viewed as in Fig. 3. The knurled roller 16 and the smooth roller 17 slide over the paper and follow the arc of the curved guide 13 to prepare for a return movement which will deliver the ticket when printed. The knurled grip roller 21 biased by the spring 20 prevents the paper from slipping back.

At the completion of the stroke of the solenoid plunger 1<sup>a</sup> the arm 25 on the shaft 14 is latched by the pawl 26.

While the arm 15 and the shaft 14 are moving in counter-clockwise direction, the pin 28 depresses the guillotine lever 29 and opens the



guillotine blade 30 until the guillotine lever 29 is latched by the tooth 31 attached to it engaging the pawl 32, thus holding the guillotine blade in open position.

When the solenoid operates, rotating the shaft 6, the link 107 actuates the shaft 108 and the segment 109 rotates the pinion 110 which carries with it the arm 111 and the pawl 112. The pawl 112 passes over the shroud 113 which has already been positioned by the operation of one of the stake keys and engages the ratchet wheel 114 which rotates the shaft 115, thereby registering the value of the ticket issued on both the total counter and on the forecast, or the win or place counter, depending on the keys depressed. Simultaneously the toe of the plate 120 passes the trip pawl 121 of the rocker 122 and the set up pawl 123 is lifted to re-engage one of the pins 5 on the contactor rotor. The boss 124 engages the nuts 125 on the rod 124' and lifts the spring 126 off the contacts 2, breaking the circuits and allowing the plunger 1<sup>a</sup> to be returned by the spring 1'. The spring 123 when lifted up is latched on the pawl 3, holding open the contacts 2.

The return movement of the plunger 1<sup>a</sup> rotates the shaft 6 and the eccentric 6' in the reverse direction, allowing the platen 8 to be raised by the spring 37 acting through the rocker 36.

When the plunger 1<sup>a</sup> completes its return stroke, the pin 27 engages the pawl 26 and releases the arm 25 on the shaft 14. The shaft 14 now rotates under the influence of the spring 35, causing the arm 15 to feed the paper strip forward, pushing the printed ticket out of the machine.

At the end of the swing of the arm 15, the lever 34 strikes the bell-crank 32' which disengages the pawl 32 from the tooth 31 on the lever 29. The spring 33 now rotates the lever 29 and pushes down the blade 30 to cut off the ticket.

The spring 35 in rotating the shaft 14 in clockwise direction, as seen in Fig. 2, moves the link 107 to the left whereby to rotate the shaft 108 in the reverse direction, i. e., counter-clockwise as viewed in Fig. 6. This restores the pawl 112 to its original position by the reverse movement of the sector 109. The toe of the plate 120 also engages the trip pawl 121 and actuates the rocker 122, the link 127 and the shaft 79, thereby withdrawing the locking bars 73, 74 and 75 by engagement of the pins 79' with slots in the locking bars, releasing the depressed keys which are then returned by their springs.

The set up pawl 123 which had engaged one of the pins 5 on the contactor rotor now rotates the contactor rotor until the roller 91 passes over the peak of the cam 92. The contactor rotor is then retained on the tooth 89 in readiness for another cycle of operations.

To test the mechanism, the test key T is depressed. This key operates the machine in the same way as when a normal betting ticket is being issued, except that the bars 59, 60 and 61 are not moved so that the type wheels and sectors remain in their central position to print the word "Test." Also the two change-over contacts 137 disconnect the check signal wires from the control apparatus and energise directly the check relay 100, whereby to cause a test ticket to be issued without the usual check signal from the control apparatus. The shroud 113 in the test position prevents the pawl 112 from giving any rotational movement to the counters, there-

by leaving them in the same position as before the issue of the test ticket.

The counting mechanism originally claimed herein is now claimed in divisional application Ser. No. 3,798 filed January 22nd, 1948, Patent No. 2,527,996.

What is claimed is:

1. A ticket printing and issuing machine for use with totalisators, including a ticket printing mechanism comprising a plurality of type wheels for printing a ticket showing the amount of the stake and the competitors selected for first and second place, said wheels including a wheel for printing the stake for which the ticket is issued, a second wheel for printing the competitor number selected for first place and a third wheel for printing the competitor number selected for second place, a separate set of keys for operating each type wheel, mechanism associated with each set of keys for operating its respective type wheel, an actuator for operating the printing mechanism, means for energizing the actuator on operation of a key in each set of keys, the set of keys for the stake wheel including a "reverse" key for reverse betting, a check bar operable by the "reverse" key, a reverse check shaft having a pin engaged by said check bar, the set of keys for operating the second wheel including keys for "win" and "place" respectively, a check bar associated with the "win" and "place" keys, and a second pin in the reverse check shaft engageable by the check bar associated with the "win" and "place" keys, whereby depression of the "win" or "place" key operates the reverse check shaft to lock the "reverse" key in inoperative position and vice versa.

2. A ticket printing and issuing machine for use with totalisators, including a ticket printing mechanism comprising a plurality of type wheels for printing a ticket showing the value of the stake and the competitors selected for first and second place, said wheels including a wheel for printing the stake for which the ticket is issued, a second wheel for printing the competitor number selected for first place and a third wheel for printing the competitor number selected for second place, a separate set of keys for operating each type wheel, mechanism associated with each set of keys for operating its respective type wheel, an actuator for operating the printing mechanism, and means for energizing the actuator on operation of a key in all of the sets of keys, the said mechanism for operating the respective type wheels by the keys including a toothed sector for each wheel arranged to rotate the type wheel, a control plate for each set of keys, a slidable bar connecting the control plate with the sector for the type wheel for the particular set of keys, each control plate having curved slots therein respectively adjacent keys of its set, and a roller carried by each key engaging in one of the slots in the control plate whereby depression of a key forces the plate associated therewith to move laterally an amount depending upon the curvature of the slot associated therewith.

3. A ticket printing and issuing machine as claimed in claim 2, in which one of said sets of keys includes a "test" key and that the slot for the "test" key in the control plate associated therewith is straight, whereby actuation of the "test" key does not move the control plate.

4. A ticket printing and issuing machine for use with totalisators, including a ticket printing mechanism comprising a plurality of type wheels for printing a ticket showing the value of the



stake and the competitors selected for first and second place, said wheels including a wheel for printing the stake for which the ticket is issued, a second wheel for printing the competitor number selected for first place and a third wheel for printing the competitor number selected for second place, a separate set of keys for operating each type wheel, mechanism associated with each set of keys for operating its respective type wheel, a check bar for each set of keys for locking the keys of the set in place, means associated with certain of the keys for operating the check bar for other keys to lock said other keys against operation when said certain keys are depressed, an actuator for operating the printing mechanism, and means for energizing the actuator on operation of a key in all of the sets of keys.

5. A ticket printing and issuing machine for use with totalisators, including a ticket printing mechanism comprising a plurality of type wheels for printing a ticket showing the value of the stake and the competitors selected for first and second place, said wheels including a wheel for printing the stake for which the ticket is issued, a second wheel for printing the competitor number selected for first place and a third wheel for printing the competitor number selected for second place, a separate set of keys for operating each type wheel, mechanism associated with each set of keys for operating its respective type wheel, the set of keys for operating the stake printing wheel including a "field" key, each of the other sets of keys including competitor keys, a rotatable check shaft operatively associated with the "field" key, a slotted link, a pin on said check shaft engaging in the slot of said link, a check bar operatively associated with the competitor keys of each of said other sets of keys, a lever attached to said bars and to said link, an actuator for operating the printing mechanism, and means for energizing the actuator on operation of a key in all of the sets of keys.

6. A ticket printing and issuing machine for use with totalisators, including a ticket printing mechanism comprising a plurality of type wheels for printing a ticket showing the value of the stake and the competitors selected for first and second place, said wheels including a wheel for printing the stake for which the ticket is issued, a second wheel for printing the competitor number selected for first place and a third wheel for printing the competitor number selected for second place, a separate set of keys for operating each type wheel, mechanism associated with each set of keys for operating its respective type wheel, the sets of keys for operating the second and third printing wheels being arranged in adjacent rows with selected keys in one row arranged directly opposite corresponding keys in the other row, pins disposed between corresponding opposite keys in the rows, said pins being coned at both ends, said corresponding opposite keys having depressions facing the ends of the pins therefor, said pins being of such a length that when one coned end is clear of the depression in one key the other coned end is in engagement with the depression in the opposite key, an actuator for operating the printing mechanism, and means for energizing the actuator on operation of a key in all of the sets of keys.

7. A ticket printing and issuing machine for use with totalisators, including a ticket printing mechanism comprising a plurality of type wheels for printing a ticket showing the value of the stake and the competitors selected for first and second place, said wheels including a wheel for printing the stake for which the ticket is issued, a second wheel for printing the competitor number selected for first place and a third wheel for printing the competitor number selected for second place, a separate set of keys for operating each type wheel, mechanism associated with each set of keys for operating its respective type wheel, the set of keys for operating the stake printing wheel including keys for different standard amounts of money, and a "field" stake key for "field" betting, the set of keys for operating the second printing wheel including keys for "win" and "place" and a key for "field" for first place, the set of keys for operating the third type wheel including a "field" key, a check bar associated with the set of keys for operating the second printing wheel, a second check bar associated with said "field" stake key, a "field" check shaft having a pin therein engageable by said second check bar, a second pin in said shaft, a third check bar engageable by said second pin and operatively associated with the "win" and "place" keys, means actuated by depression of the "field" stake key for moving said first mentioned check bar into locking position with respect to the keys associated therewith, the depression of said "field" stake key also effecting lateral movement of said third check bar into locking position with respect to the "win" and "place" keys, an actuator for operating the printing mechanism, and means for energizing the actuator on operation of a key in all of the sets of keys.

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