

June 14, 1966

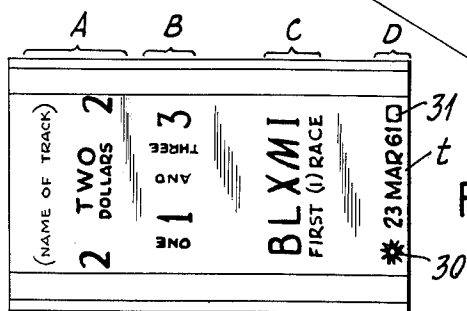
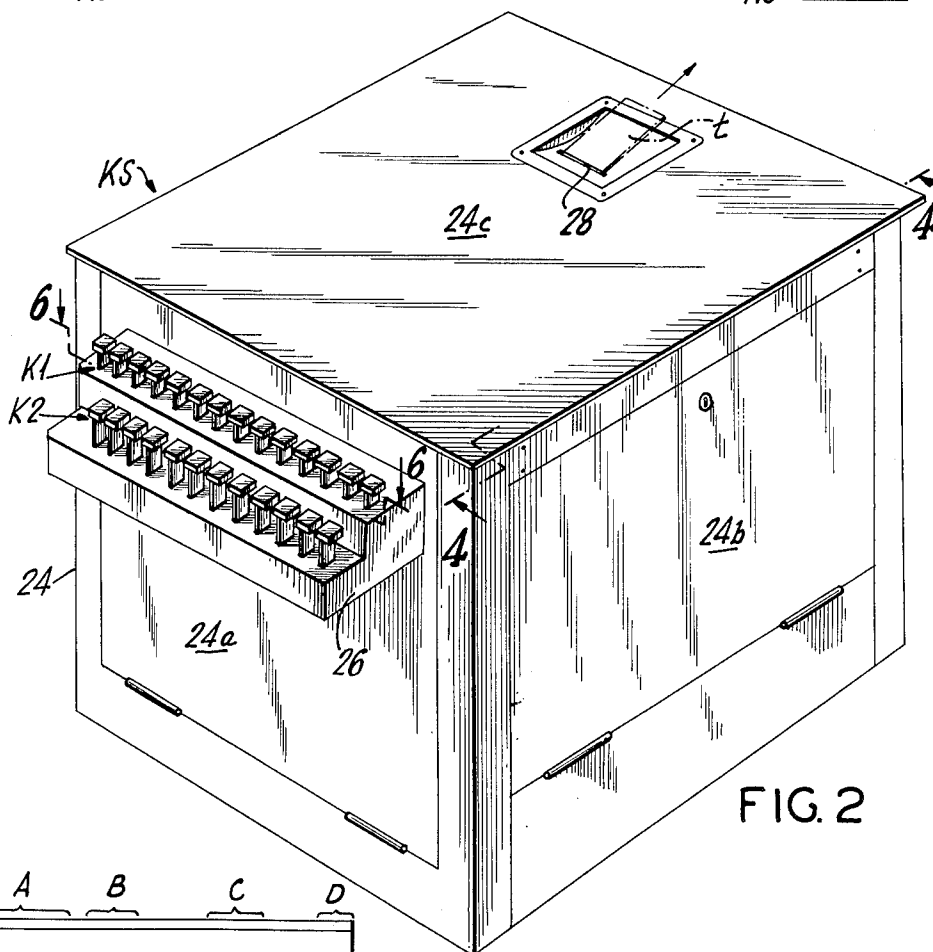
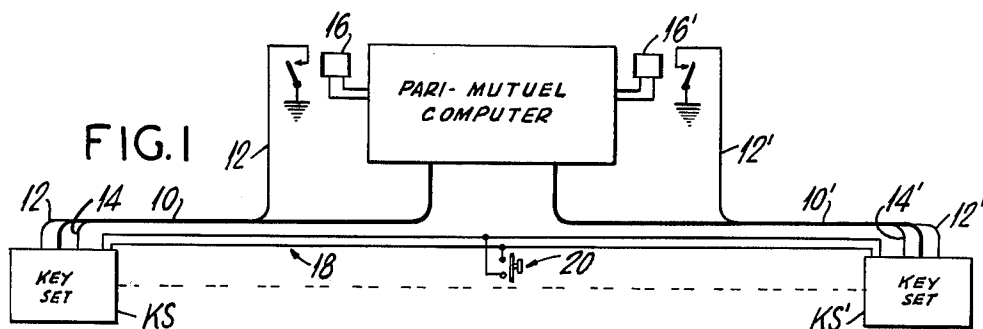
A. F. HOHMANN

3,255,692

TICKET PRINTING AND ISSUING DEVICE

Original Filed June 5, 1961

12 Sheets-Sheet 1



INVENTOR.
ALBERT F. HOHMANN

BY

S.C. Juter

ATTORNEY.

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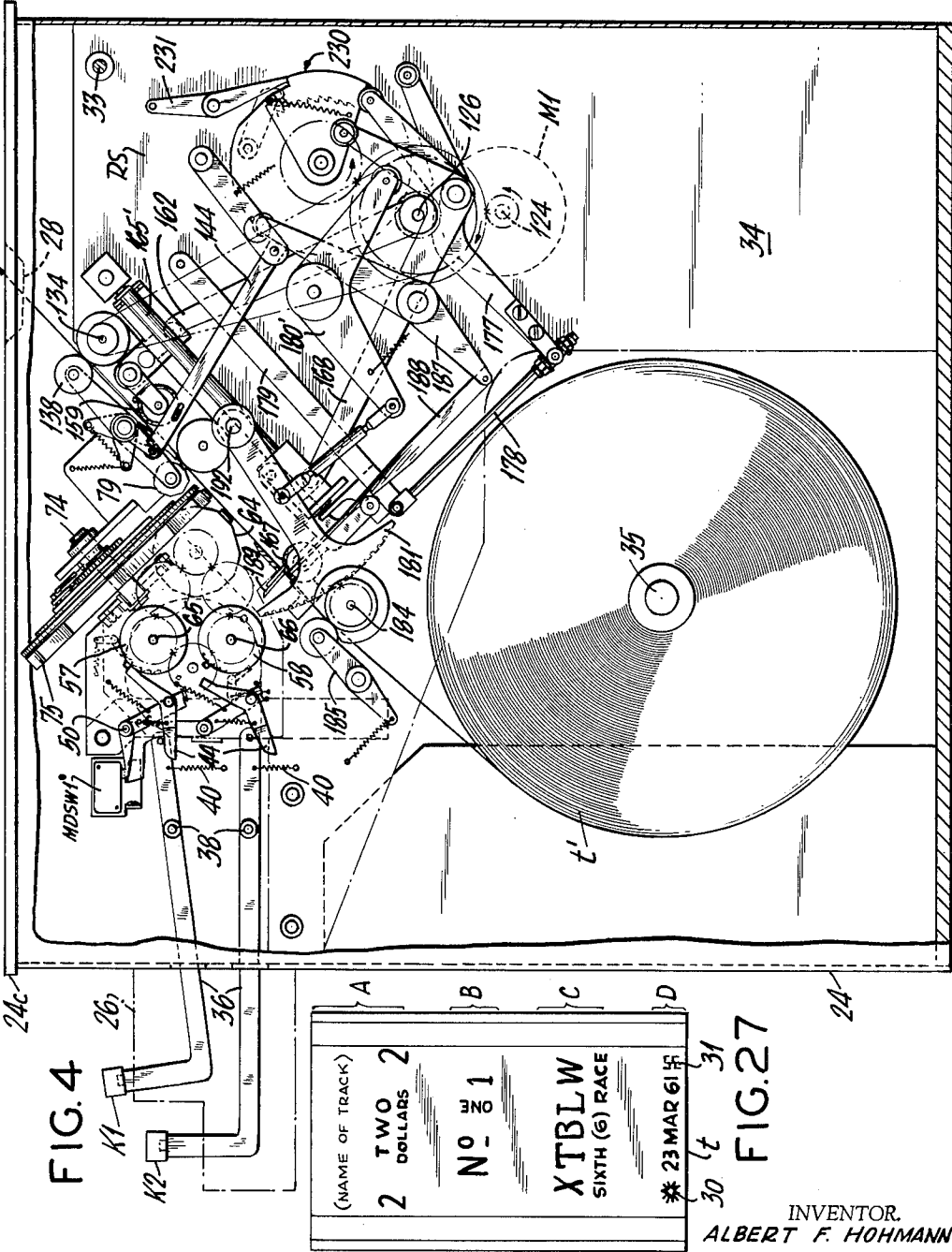
A. F. HOHMANN

3,255,692

TICKET PRINTING AND ISSUING DEVICE

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12 Sheets-Sheet 2



BY

INVENTOR.
ALBERT F. HOHMANN

S. C. Juter

ATTORNEY.

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A. F. HOHMANN

3,255,692

TICKET PRINTING AND ISSUING DEVICE

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12 Sheets-Sheet 3

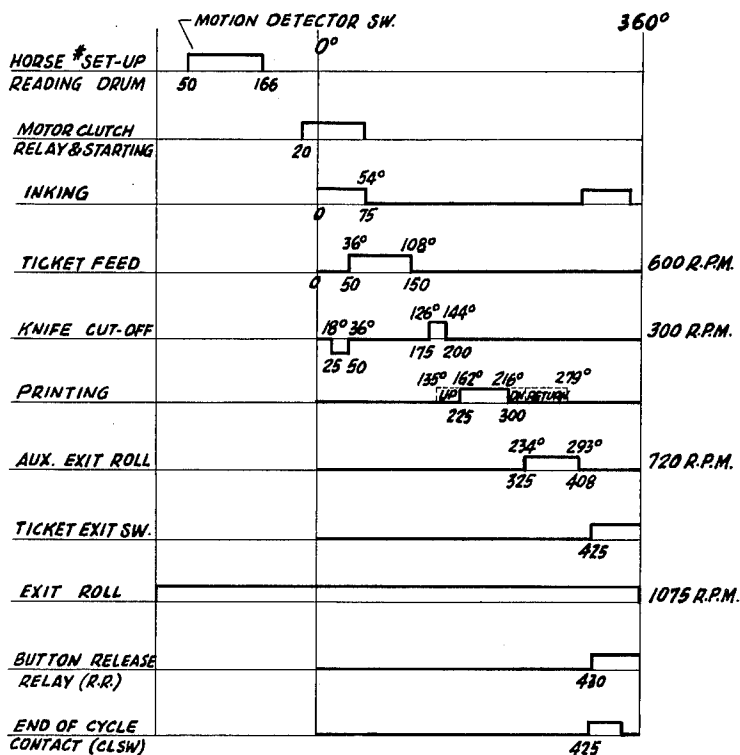


FIG. 5

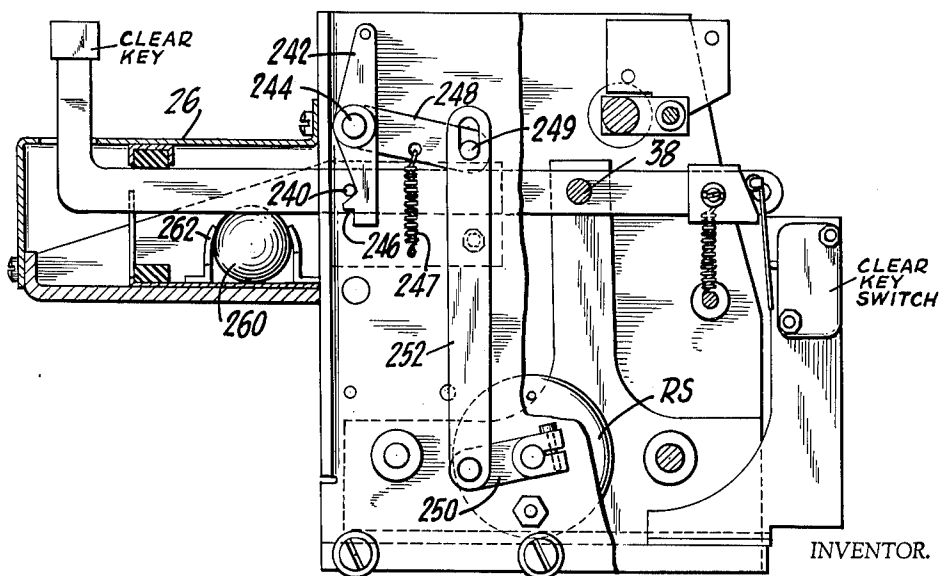


FIG. 7

BY

INVENTOR.
ALBERT F. HOHMANN

S.E. Jeter

ATTORNEY.

June 14, 1966

A. F. HOHMANN

3,255,692

TICKET PRINTING AND ISSUING DEVICE

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12 Sheets-Sheet 4

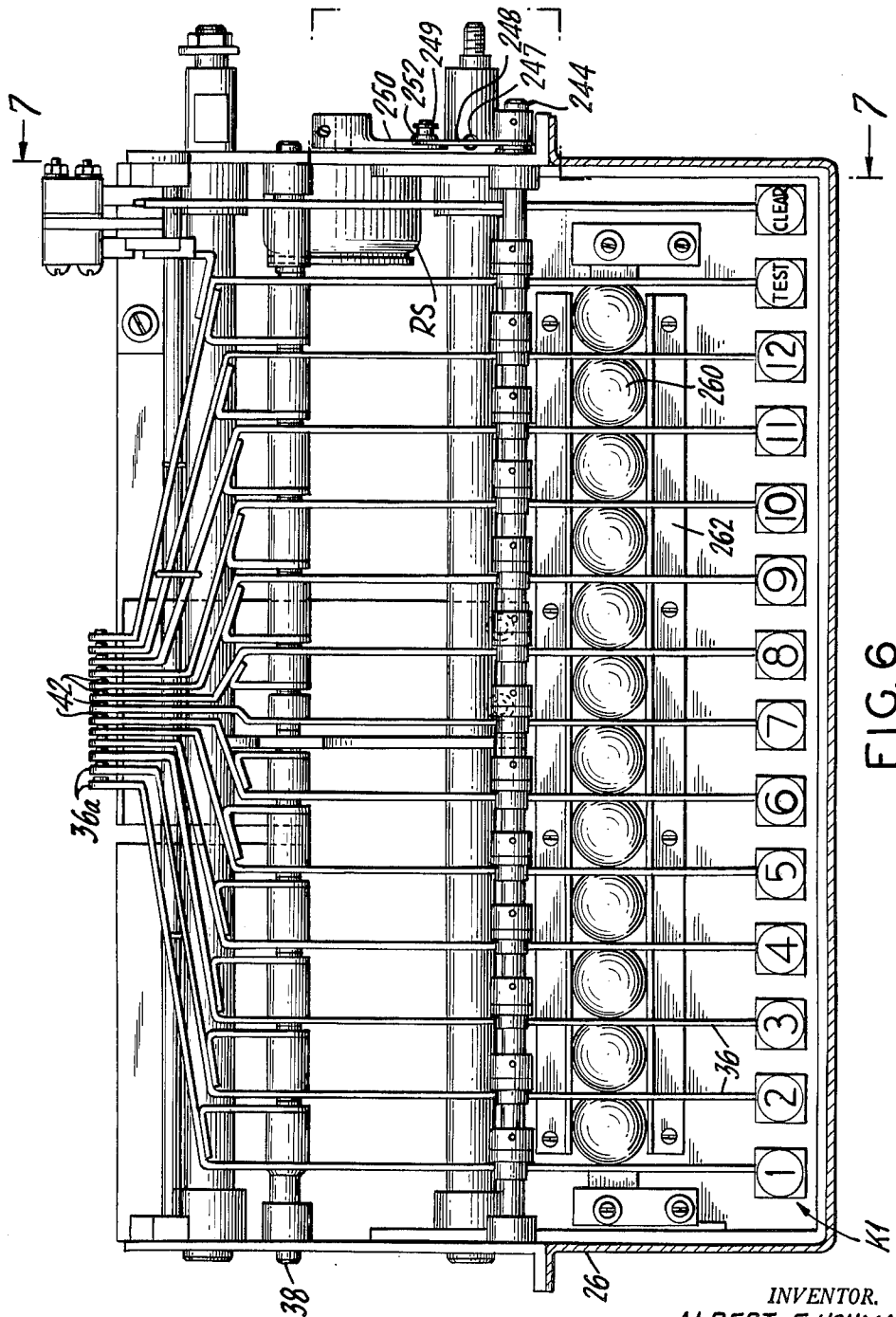


FIG. 6

INVENTOR.
ALBERT F. HOHMANN

BY

S. E. Juter

ATTORNEY.

June 14, 1966

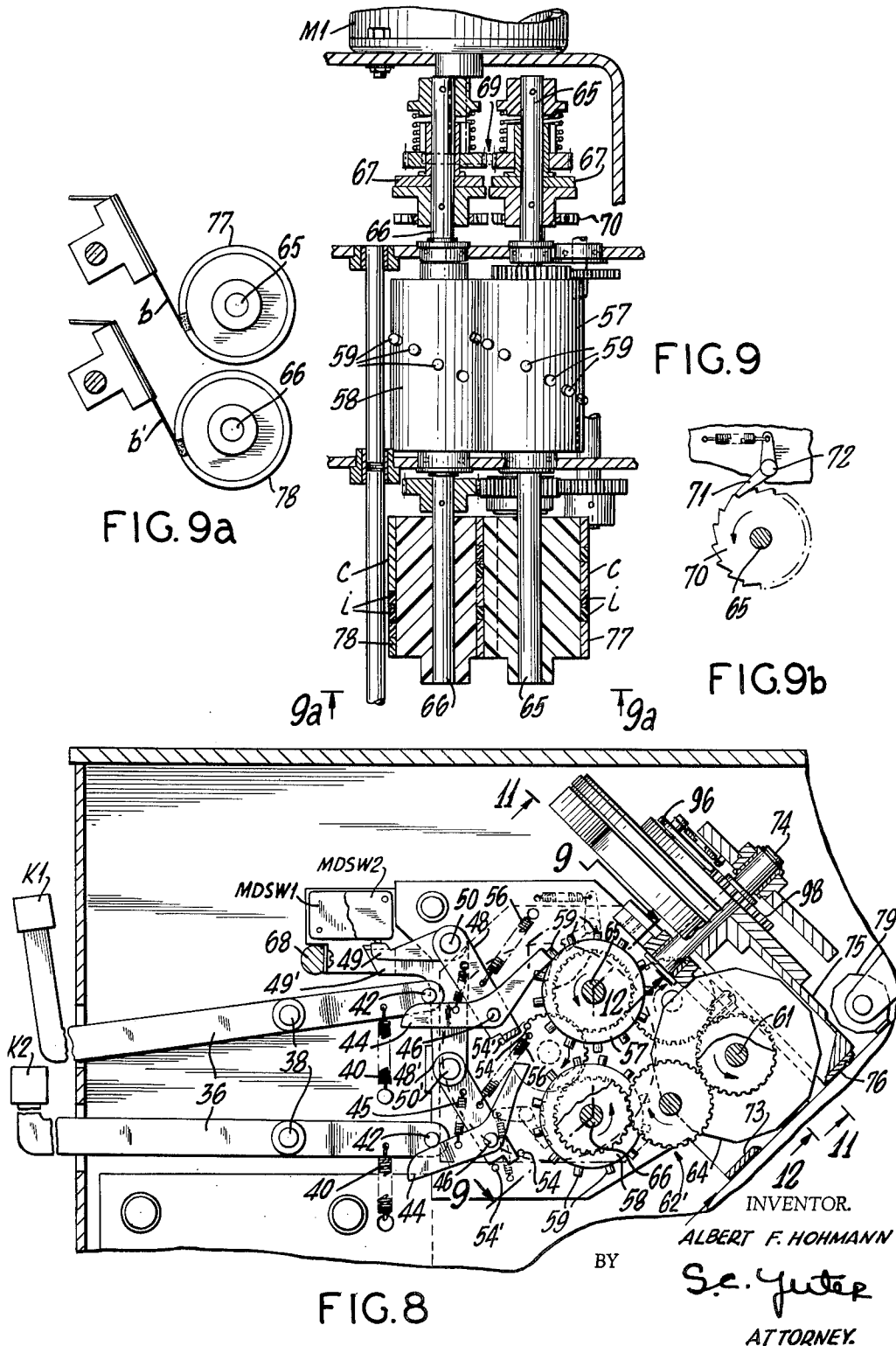
A. F. HOHMANN

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TICKET PRINTING AND ISSUING DEVICE

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12 Sheets-Sheet 5



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A. F. HOHMANN

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TICKET PRINTING AND ISSUING DEVICE

Original Filed June 5, 1961

12 Sheets-Sheet 6

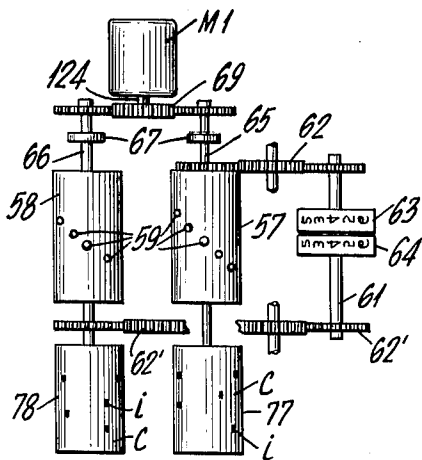


FIG. 10

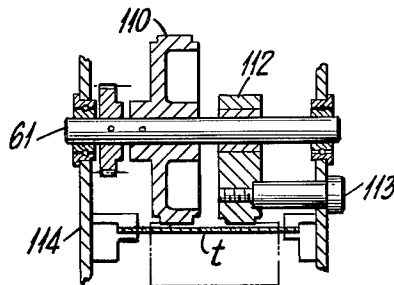


FIG. 12a

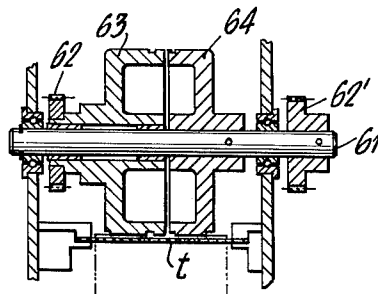


FIG. 12

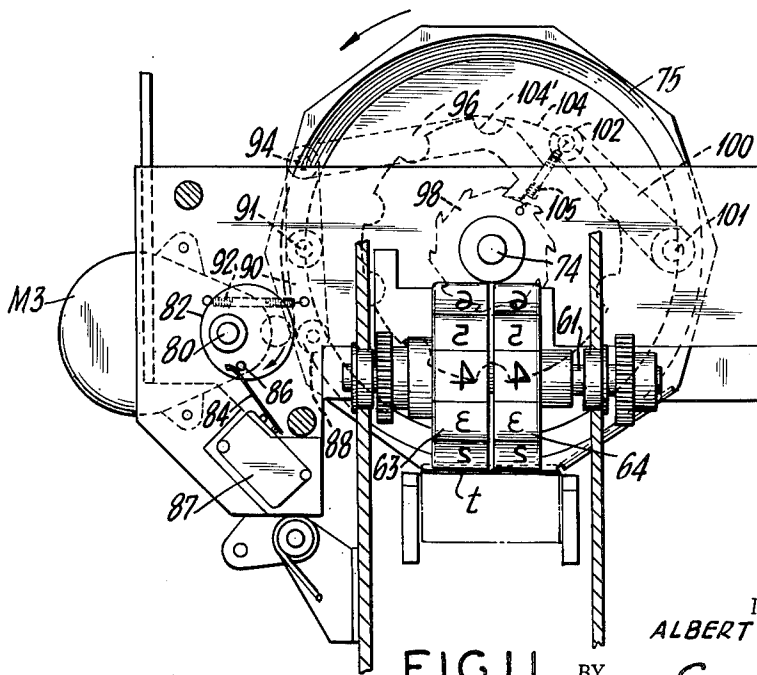


FIG. 11

BY

INVENTOR.
ALBERT F. HOHMANN

S. C. Yuter

ATTORNEY.

June 14, 1966

A. F. HOHMANN

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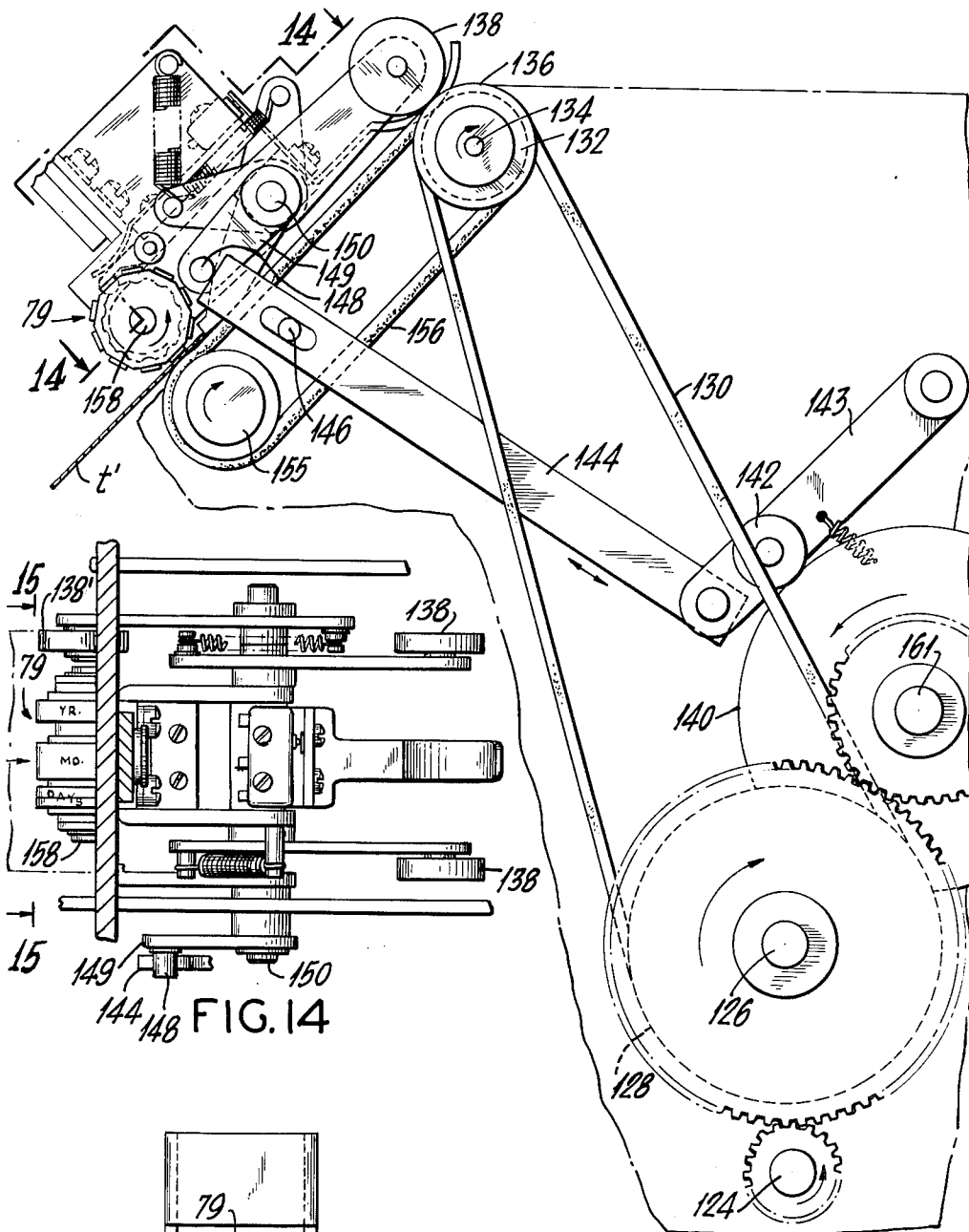


FIG. 13

INVENTOR.

ALBERT F. HOHMANN

BY

S. C. Yuter

ATTORNEY.

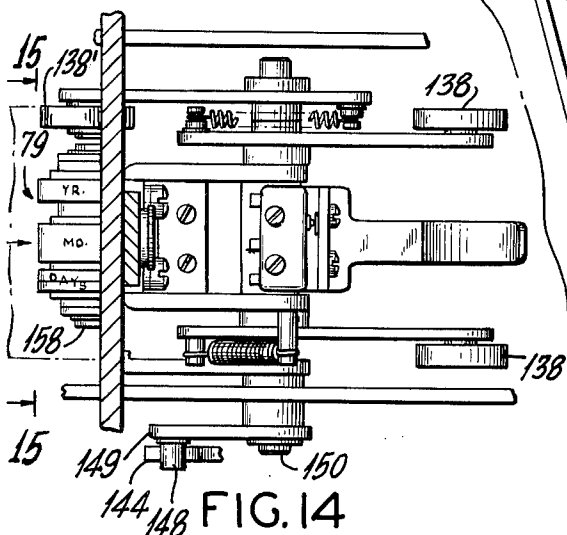


FIG. 14

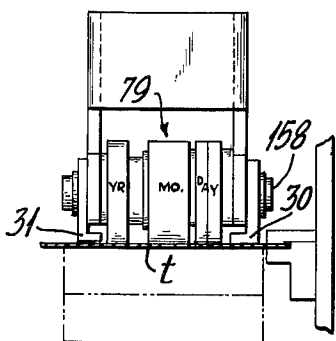


FIG. 15

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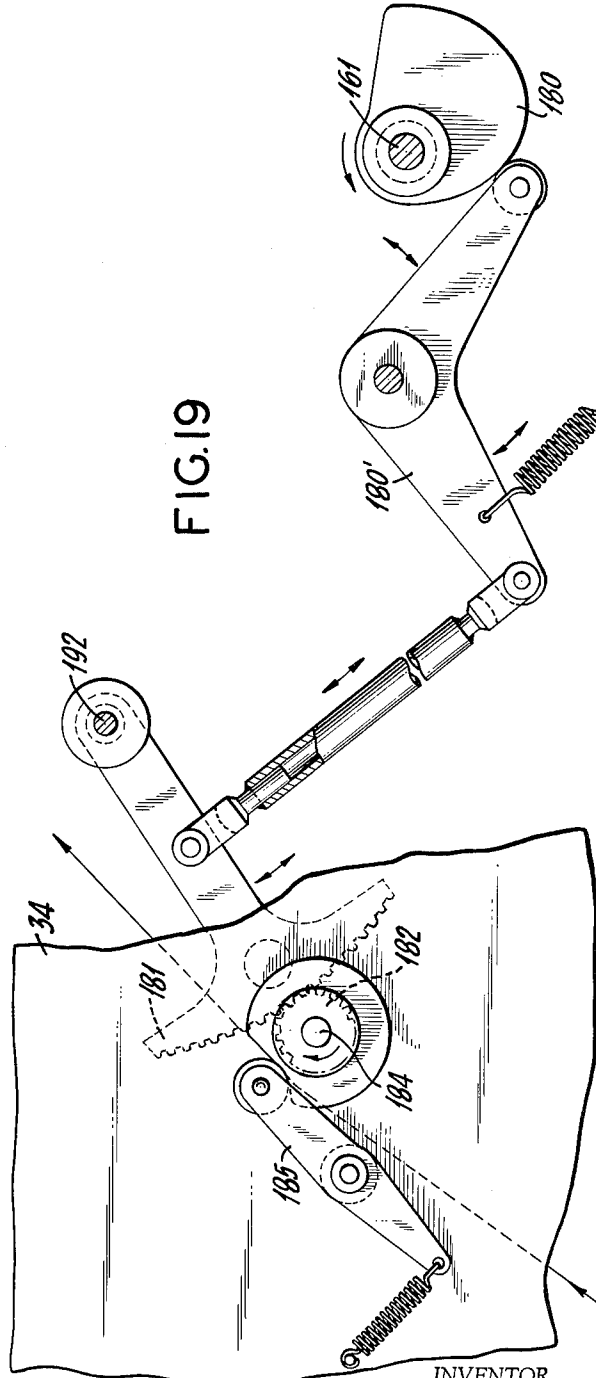
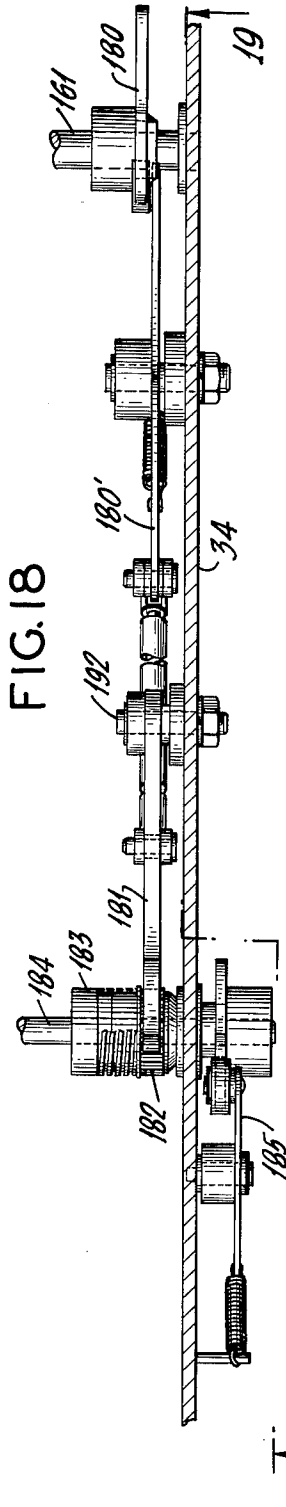
A. F. HOHMANN

3,255,692

TICKET PRINTING AND ISSUING DEVICE

Original Filed June 5, 1961

12 Sheets-Sheet 9



BY

INVENTOR.
ALBERT F. HOHMANN

Ge. Juter

ATTORNEY.

June 14, 1966

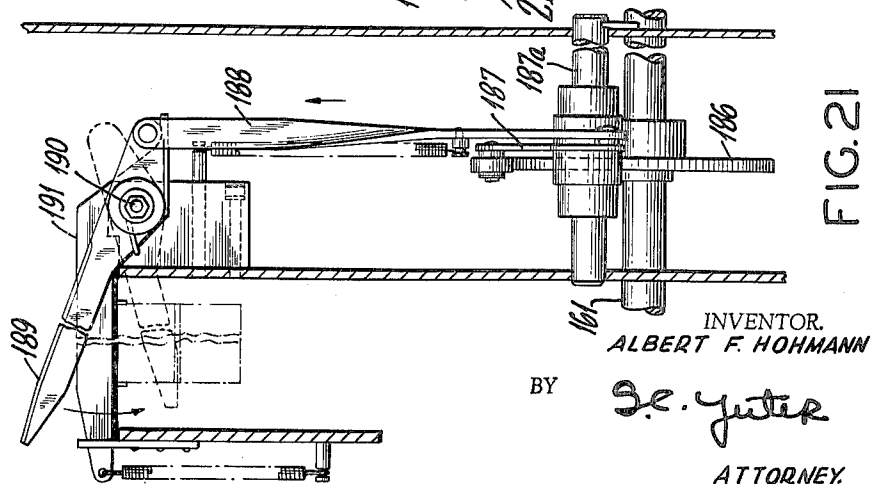
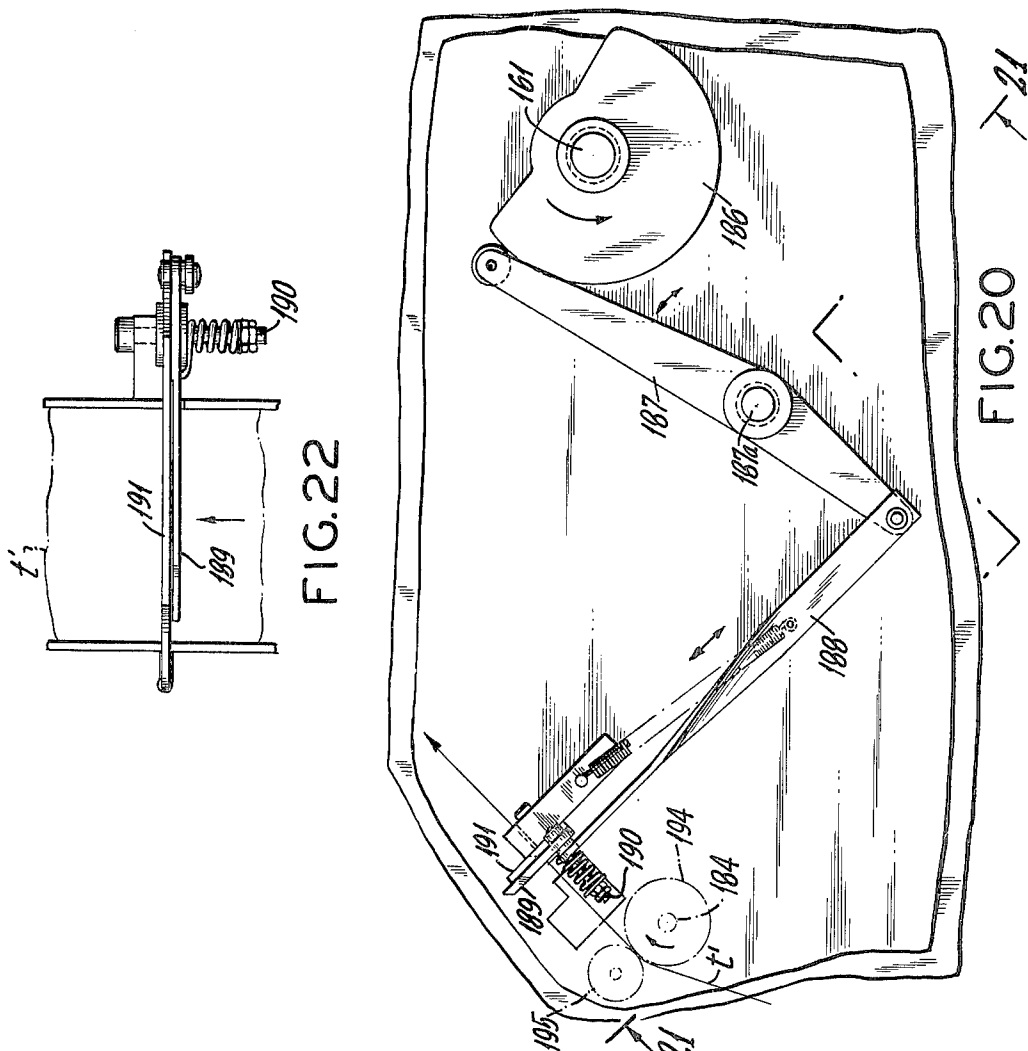
A. F. HOHMANN

3,255,692

TICKET PRINTING AND ISSUING DEVICE

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12 Sheets-Sheet 10



INVENTOR.
ALBERT F. HOHMANN

BY

G. E. Juter

ATTORNEY.

June 14, 1966

A. F. HOHMANN

3,255,692

TICKET PRINTING AND ISSUING DEVICE

Original Filed June 5, 1961

12 Sheets-Sheet 11

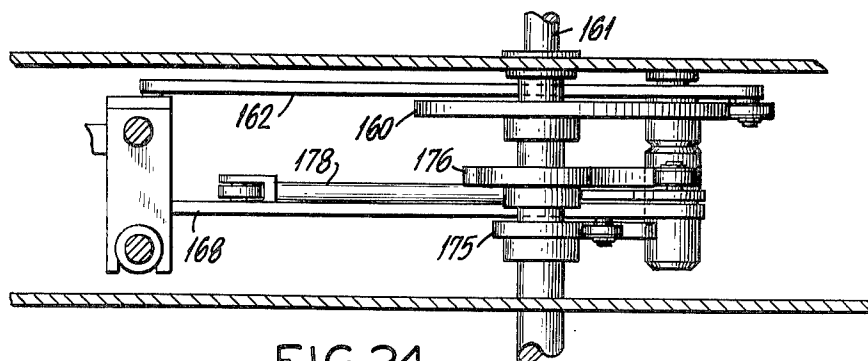


FIG. 24

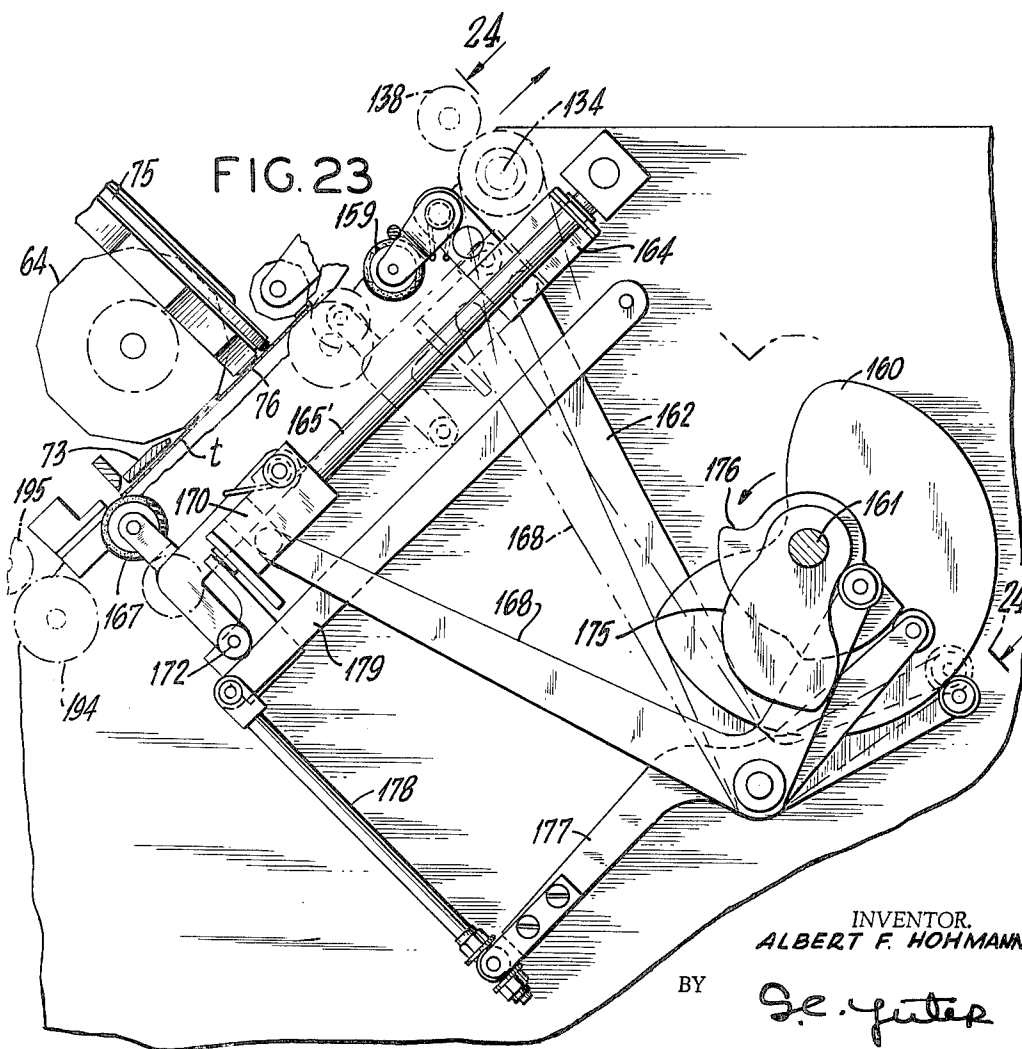


FIG. 23

INVENTOR.
ALBERT F. HOHMANN

BY

Se. Juter

ATTORNEY.

June 14, 1966

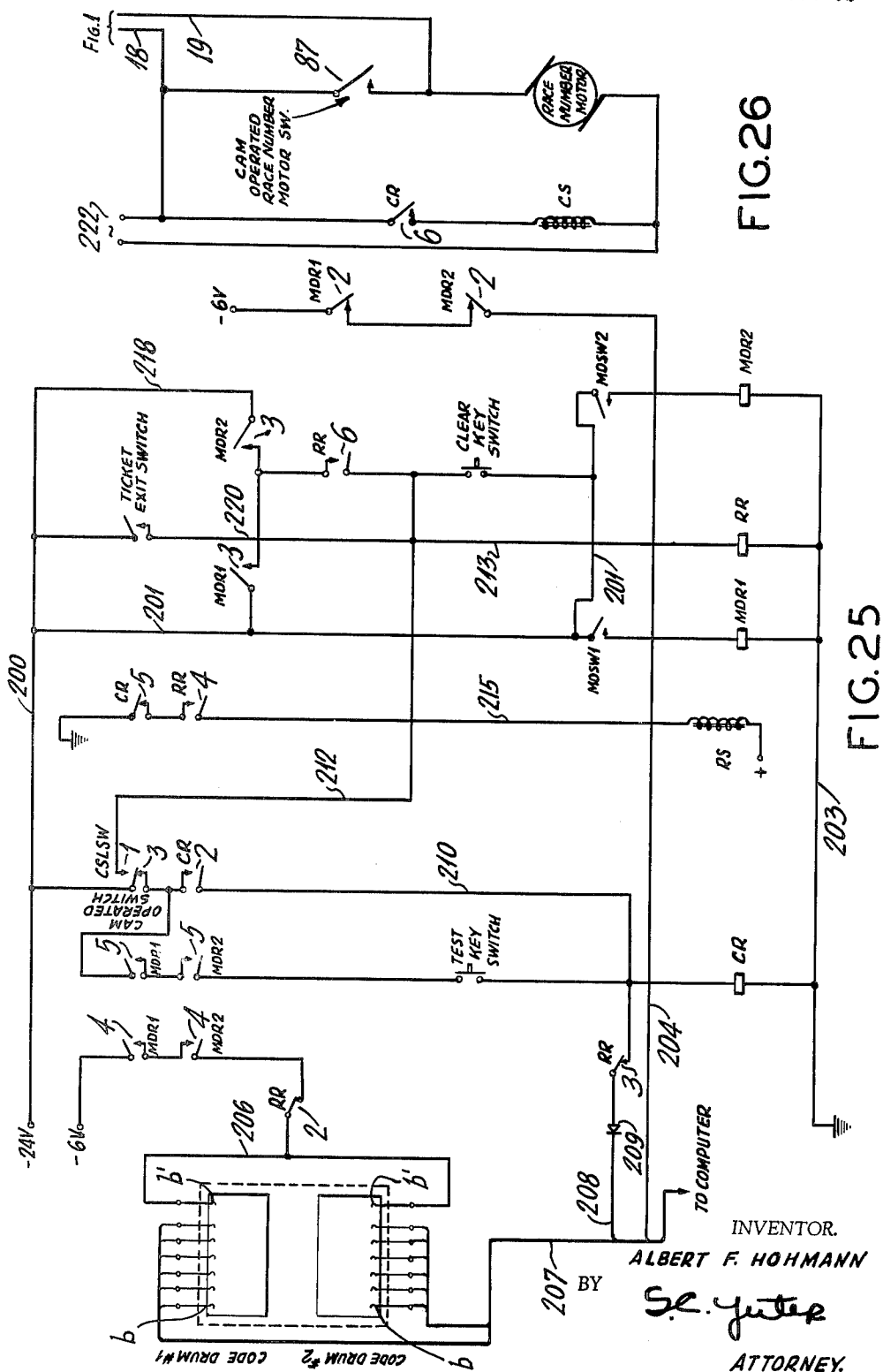
A. F. HOHMANN

3,255,692

TICKET PRINTING AND ISSUING DEVICE

Original Filed June 5, 1961

12 Sheets-Sheet 12



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3,255,692

TICKET PRINTING AND ISSUING DEVICE

Albert F. Hohmann, Hackensack, N.J., assignor to Dig-
tronics Corporation, Albertson, N.Y., a corporation of
Delaware

Original application June 5, 1961, Ser. No. 115,018.
Divided and this application July 15, 1964, Ser. No.
384,040

8 Claims. (Cl. 101--66)

This is a division of application Serial No. 115,018,
filed June 5, 1961, now abandoned.

This invention relates to an improved keyset-controlled
ticket printing and issuing device which generates different
coded signals respectively corresponding to different items
of digital data represented by the tickets for entry into a
pari-mutuel or other computing apparatus for totalizing
and other purposes.

The device of the instant invention may be employed
for printing and issuing tickets for trains, airlines, and
other transportation companies, theatres and the like, but
is especially suitable for issuing tickets at the betting win-
dows of pari-mutuel race tracks. The devices now em-
ployed at race tracks generally involve a large number of
electrical relay circuits with numerous make-and-break
contacts, for selection, printing and other purposes, and
such circuits require continual adjustment, cleaning and
other maintenance and increase the possibility of trouble
or failure. The consequences of any such failure, par-
ticularly at race tracks, are indeed serious.

An object of the instant invention is to provide a keyset-
controlled ticket printing and issuing device of the char-
acter disclosed, in which the various moving parts are
positively actuated and positioned by interlocking me-
chanical members, and in which the use of a large num-
ber of relay circuits and contact elements is not required
for the various keyset operations including the generation
of item data signals for application to a computer.

Another object is a keyset of the foregoing character
which is extremely rugged, reliable and accurate, and
which may be produced and sold at a lower price than the
former devices which utilize a large number of electrical
components.

A further object is to provide suitable means for pre-
venting the issuance of a ticket unless and until the signals
representing the data on the ticket have been received by
the associated computer; more specifically, the keyset will
not issue a ticket until a reverte control signal has been
received from the computer apparatus.

An additional object is a keyset device having improved
structure for selecting and properly positioning any of a
plurality of different characters on a printing wheel for
producing tickets respectively representing different items,
and for generating code signals representing the currently
selected item.

Still another object is the provision of a keyset of the
foregoing character having a rotatable signal coding device
for producing a code signal representing the currently
selected item, in which the print wheel and coding device
remain positively engaged whereby the input from an op-
erated key to the print wheel and coding device is not
discontinued at any time.

Another object is a keyset particularly adapted for race
track use, and which has a race code print wheel for print-
ing on the issued tickets the identifying number and code
of each of the races, which print wheel may be controlled
from outside the keyset by an incoming circuit adapted to
turn all of the race number wheels simultaneously in all
of the various keysets at the track to identify the next race,
thereby obviating the necessity of opening up a large num-
ber of keysets (several hundred at a large track) and

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manually changing the coding print slugs before each race
as generally required with existing systems.

A still further object is a keyset-controlled ticket print-
ing and issuing device for race track use, which may
readily be converted from a device for issuing only "single
bet" tickets to one for issuing either "single bet" or "daily
double" tickets as desired, and vice versa.

Other objects and advantages of the invention will be
apparent from the following detailed description of an
illustrative embodiment thereof, taken in connection of
the accompanying drawings in which:

FIG. 1 diagrammatically shows a plurality of keysets
for issuing betting tickets at the various Win, Place and
Show betting windows at a pari-mutuel race track, and for
simultaneously sending the betting information to a pari-
mutuel computer;

FIG. 2 shows one of the keysets enclosed in its housing,
and having two rows of manually operable keys for en-
abling "daily double" betting tickets to be issued;

FIG. 3 shows the various data items and information
appearing on a printed daily double ticket as issued by
the keyset;

FIG. 4 is a view, in elevation, of certain of the keyset
mechanisms, looking inward from the right hand side of
the keyset of FIG. 2, with the side plate removed;

FIG. 5 is a timing chart of the ticket printing and issuing
operations;

FIG. 6 shows certain details of the key-lever mounting
structure for the upper row of keys;

FIG. 7 is a view, in elevation, taken along the line 7-7
of FIG. 6;

FIG. 8 shows details of the key-controlled selecting
levers, selection stop pins and other mechanical members
for stopping and rigidly holding the print wheels in fixed
positions while printing the identification numbers of the
respective horses on which the bets are placed, as well as
the identifying numbers of the successive races;

FIG. 9 is a view partly in section, taken along the line
9-9 of FIG. 8, showing details of the selection drums
and signal coding drums employed, with drive means for
rotating the drums;

FIG. 9a is a fragmentary view of certain of the electrical
contact brushes that engage the signal coding drums for
sending signals to a pari-mutuel computer;

FIG. 9b is a detail of back-stop ratchet and pawl ele-
ments seen in FIG. 9;

FIG. 10 is a diagrammatic view of the driving gear
trains for the selection drums and signal code drums of
FIG. 9;

FIG. 11 is a view taken along the line 11-11 of FIG. 8,
looking in the direction of the arrows;

FIG. 12 is a sectional view taken along the line 12-12
of FIG. 8, and showing the horse identification wheels for
printing daily double tickets;

FIG. 12a is a modification of the structure of FIG. 12
for printing "regular" or "straight" betting tickets, for
which only one horse identification print wheel is required;

FIG. 13 shows mechanism for issuing the printed tickets;

FIG. 14 is a view, partly in section, taken along the line
14-14 of FIG. 13;

FIG. 15 is a view taken along the line 15-15 of
FIG. 14;

FIG. 16 is a partial top view of the inking mechanism.

FIG. 17 is a side view taken along the line 17-17 of
FIG. 16, showing certain details of the inking mechanism;

FIG. 18 is a top view of ticket advancing mechanism;

FIG. 19 is a side view of FIG. 18, looking in the di-
rection of the arrows 19, 19;

FIG. 20 is a side view of cam-operated ticket shearing
mechanism;

FIG. 21 is a view looking along the line 21-21 of
FIG. 20;

FIG. 22 is a top view of the ticket shearing blades of FIGS. 20 and 21;

FIG. 23 shows cam-actuated means for printing the desired data on a ticket;

FIG. 24 is a view taken along the line 24—24 of FIG. 23, looking in the direction of the arrows;

FIGS. 25 and 26 jointly show a local control circuit for the keyset; and

FIG. 27 shows the various data items and information appearing on a straight ticket, as distinguished from a daily double ticket.

FIG. 1 diagrammatically shows a pari-mutuel system for race tracks, comprising a number of keysets KS to KS' which are located at the betting windows for entering the bets before each race, and for issuing the tickets to the bettors. In accordance with the instant invention the moving parts of the keyset device are positively actuated and positioned by mechanical elements to thereby obviate the necessity of having a large number of electrical and electronic elements for selection and printing purposes, and moreover the mechanical elements are adapted to operate at very high speeds; the time required for the successive selection, printing and issuing operations is but a fraction of a second.

The keysets KS to KS' are each connected by a cable 10 or 10' to a high speed pari-mutuel computer which determines the returns to be paid on the winning tickets at the conclusion of each race, each cable including several conductors for transmitting code signals to the computer for entering the necessary data therein, and also two control conductors 12 and 14, as hereinafter explained in detail in connection with the circuit diagram of FIGS. 25 and 26. As indicated in FIG. 1, the conductor 12 is controlled by a relay 16 or other suitable element embodied in the computer. A circuit 18 extends between the various keysets for enabling all of the race code print wheels (which print on the issued tickets the identifying number and code symbol of each race) to be turned simultaneously in all of the keysets to identify the next race, as hereinafter explained.

Referring to FIG. 2, the keyset is enclosed within a metal housing, generally indicated at 24, having hinged front and side plates 24a and 24b and a removable top plate 24c. A keyboard housing or cover 26 extends from the front of the housing 24, and the keyboard shown comprises an upper row *k1* and a lower row *k2* of manually operable keys, so the keyset is adapted to issue daily double tickets in which a first horse selection is made by depressing the proper key in the lower row, and a second horse selection made by depressing the proper key in the upper row. The tops of the keys bear numbers which represent the numbers assigned to the various horses in a race. Each printed ticket *t* is ejected through a slot 28 in the top the keyset housing.

FIG. 3 shows a daily double ticket as issued. The name of the track and the price of the ticket (in this case a Two Dollar bet) are printed on a portion A of the ticket. Portion B has printed thereon the identifying numbers of the two horses on which the bet is placed. Portion C has printed thereon the number identifying the race and a code number or character also identifying the particular race; the code number "BLXMI" is printed by means of a type slug which may manually be replaced on different days thereby to make it more difficult for a ticket to be altered illegally or counterfeited. Portion D of the ticket contains the date which is printed by a set of date wheels that are manually changed for each day of the meet. Two special code characters 30 and 31 opposite the date also make it difficult to alter the date illegally or to counterfeit a ticket.

Referring to FIGS. 4, 6 and 8, various details of the keyset mechanisms are shown, FIG. 4 being a view looking inward from right hand side of FIG. 2 with the side plate removed. Reference number 34 of FIG. 4 identifies one of the vertical mounting plates for the equipment;

two other mounting plates are positioned behind plate 34 and hence are not seen in the figure; these plates are bolted together at their upper edges by bolts and spacers in known manner, one of the bolts being indicated at 33 in FIG. 4. A roll of ticket stock *t'* of thin cardboard is rotatably mounted on a rod 35 which is supported in any suitable manner, the ticket strip being advanced past the various print wheels and severed into ticket lengths for issuance.

The key levers 36 are pivotally mounted on rods 38 carried by fixed frame plates. The key levers have tail portions, seen at 36a in FIG. 6, with small studs 42, FIG. 8, for engagement with the ends of associated selecting levers 44. Selecting levers 44 are pivotally mounted intermediate their ends on rods 46 carried by brackets 48 and 48', seen more clearly in FIG. 8. In this figure one of the keys *k1* of the upper row of keys is shown depressed, which indicates that one of the horses has been selected for a daily double bet; the lower keys *k2* are seen in their unoperated positions, indicating that the second horse has not yet been selected. Small coil springs 40 normally bias the keys to their unoperated positions; when a key is manually depressed by a ticket seller, however, it is held down by latch members seen in FIG. 7 until the bet has been registered in the pari-mutuel computer, as hereinafter described. Each selecting lever has an individual coil spring 45 which causes the lever to turn in a clockwise direction, as viewed in FIG. 8, when the associated key is depressed, and this causes the lever to move into the path of a corresponding stop pin 59 that extends from the surface of a rotating selection drum 57 or 58. The lever engages the stop pin and stops the drum in a position corresponding to a particular selected horse and the identification number of the horse is printed on the ticket by a print wheel that rotates in unison with the selection drum hereinafter referred to.

The arms 48 and 48' respectively are embodied in brackets pivotally mounted on fixed rods 50 and 50', and these brackets are biased by coil springs 56 so that the lower ends of the arms are biased against fixed stop pins 54. Pins 54 and 54' fix the limits of a slight swinging or arcuate movement of the lower ends of the bracket members 48 and 48'. Each selection drum and print wheel are continuously rotated on a shaft driven through a slip clutch from a continuously rotating drive shaft, the slip clutch enabling the selection drum and print wheel to be stopped when a selection is effected, notwithstanding the continued rotation of the drive shaft. The operation of the foregoing assembly of the selecting arms and brackets is advantageous in that it prevents movement of the print wheel during a printing operation and thus prevents smudging of a ticket and provides a clean sharp impression of the printed data, in the following manner: The force exerted on the end of a selecting lever in engagement with its associated stop pin on the selection drum due to the continued rotation of the drive shaft causes the associated bracket 48 or 48' on which the lever is mounted to be urged against its forward stop pin 54' and thus firmly hold the print wheel against movement during a printing operation, and prevent jiggling of the wheel. Preferably, and as shown in FIGS. 9 and 9b, a ratchet and back-stop pawl arrangement is used with the driven shafts to prevent any rebound of the selection drum and print wheel when these members are stopped by the selection levers and stop pins. The bracket arms 48 and 48' have extensions 49 and 49' which respectively actuate two microswitches MDSW1 and MDSW2 mounted on a fixed rod 68 to close circuits which indicate to the computer that selections have been set up in the keyset; these switches are actuated to their circuit-closing positions just at the instant that each of the bracket arms has engaged its stop pin 54'. The switches are referred to as Motion Detector switches and their operation explained in the description of the keyset control circuit of FIGS. 25 and 26 appearing hereinafter.

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FIGS. 8 to 10 show details of the two selection drums and driving shafts therefor. As shown in FIG. 8 the drum 57 is mounted directly above the drum 58; in FIG. 9 the view is taken at an angle such that one drum does not obscure the other in the figure; and FIG. 10 is a diagrammatic representation of the drums and their driving elements. Preferably, and as shown, the stop pins 59 on each drum are arranged in a helical path so that during rotation of the drums each pin will be in alignment with its corresponding stop lever for engagement with the lever when its associated key is actuated. Referring now to FIGS. 9 and 10, the drums 57 and 58 respectively are mounted on and rotated by shafts 65 and 66 which in turn are driven through friction slip clutches 67 and a gear train 69 from the drive shaft of a continuously running motor M1 energized from alternating current power.

Two signal code drums 77 and 78 are mounted on and rotated by the shafts 65 and 66 on which the selection drums are mounted. The code drums are signal-generating devices operative in successive angular positions thereof for producing different code signals respectively representing the items of data as determined by the manually operated keys, and printed on the issued tickets such as the ticket shown in FIG. 3. The signal code drums illustrated have successive longitudinally extending rows of interspersed conducting and nonconducting areas coded to produce binary permutation code signals when these areas are in contact with a row of brushes. These may conveniently be provided by metal drums with inserts of insulation embedded in the surfaces of the drums and arranged to provide the spacing code pulses of permutation code signals, the marking code signal pulses being obtained from the conductive surface areas *c* of the drums in contact with the rows *b* and *b'* of the brushes diagrammatically shown in FIGS. 9a and 25. Separate conductors from the brushes are embodied in a cable 10 or 10' for convenience, as seen in FIGS. 1 and 25, and transmit to the pari-mutuel signals representing the data to be entered in the computer. It will be understood that other known forms of rotatable signal-generating devices may be used instead of the drums, and that other signal codes may be employed for transmitting the data.

The ratchet and back-stop pawl arrangement hereinbefore referred to for preventing rebound of the selection drums and print wheels is provided by a ratchet 70, FIGS. 9 and 9b, firmly secured in any suitable manner to each driven shaft 65 and 66, pivotally mounted on a fixed pin 72 secured to frame structure with a coacting spring-pressed back-stop pawl 71. Print wheel 63 is connected to the shaft 61 through a gear train 62, FIG. 10, and print wheel 64 is connected to the shaft 61 through a gear train 62'. The teeth of each ratchet respectively correspond to the successive print positions of the associated horse identification print wheel 63 or 64, and when a selecting lever is engaged by a corresponding stop pin to stop the rotating members, one of the teeth of the ratchet wheel 70 will always appear at the corresponding rotary position and the spring-actuated pawl will instantly enter behind the ratchet tooth and prevent rebound of the associated selection drum and print wheel.

The relative positions of the printing type faces in the area where printing of the ticket occurs are seen in FIGS. 8, 17 and 23. Looking from left to right in these figures, these faces are (1) the print slug 73, for portion A of the ticket of FIG. 3; (2) the faces of the two adjacent wheels 63, 64 for the two identification numbers of the horses, portion B of the ticket; (3) the slug 76 on race code number wheel 75 which rotates on shaft 74, portion C of the ticket; and (4) the manually settable date wheel assembly 79, shown in detail in FIGS. 14 and 15, for printing portion D of the ticket. The word "AND" in portion B of a daily double ticket may be carried by either of the two horse identification wheels, for example, on a slightly wider wheel 63 seen in FIG. 12. In the latter figure, one of the wheels 64 is pinned to shaft 61

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which is rotatable by the gear train 62'; wheel 63 is rotatable on the shaft 61 and is positioned by the gear train 62.

FIG. 11 shows details of means for stepping the race code number wheel 75 between successive races. The figure shows the relative positions of the parts at the end of a stepping cycle. During a stepping cycle a shaft 80 of an alternating current motor M3 rotates an eccentrically mounted cam 82. The cam carries a pin 86 which engages the switch arm 84 of a microswitch 87 to open the switch contacts at the end of a stepping cycle. The motor is energized for each stepping cycle by the manual closure by an attendant of a switch 20 (FIG. 1) at a central control point, for example, near the pari-mutuel computer, to supply alternating current over a circuit 18 for a short period of time to start the motor M3 of FIG. 11. As soon as the motor starts, the cam 82 starts to rotate and the pin 86 releases the switch arm 84 and the microswitch snaps into its circuit-closing position and its contacts maintain a supply of alternating current to the motor to insure that it continues in rotation until the end of the stepping cycle, whereupon the switch 87 is again opened by pin 86 on the cam 82, thereby de-energizing the motor. The motor is of a well known type having a brake solenoid to insure quick stopping when the current supply circuit is opened by the switch.

Stepping of the wheel 75 during a rotation of cam 82 is effected by a cam follower roller 88 on an actuating arm 90 pivoted at 91, the cam follower being held against the cam by a spring 92. An actuating pawl 96, pivotally mounted at 94 to lever 90, is in engagement with a ratchet wheel 98 that steps the code wheel 75 to the next printing position when motor M3 is energized as aforesaid, all of the keyset devices having their race code number wheels simultaneously stepped by remote control for the race code of the next race to be run. A detent arm 100, pivoted at 101, carries a roller 102 which, when the wheel 75 reaches the next printing position, engages one of the detents 104' in the periphery of a circular detent plate 104 secured to the wheel 75. A spring 105 urges the arm 100 and roller 102 into latching position, and the wheel is firmly held against movement during a printing operation.

FIG. 12a shows a horse identification print wheel assembly for issuing regular or straight tickets, as distinguished from daily double tickets. Print wheel 110 contains the print type for the various horse numbers, and preferably a type slug 112 is provided to print a notation, for example "No.," on a regular ticket, as seen in FIG. 27, so that an additional horse number cannot illegally be inserted to simulate a daily double ticket. The slug may be held in any suitable manner, as by the shaft 61, the slug being held from rotation by the shaft by a cap screw or bolt 113 that passes through a fixed frame plate 114. It will be understood that only one row of keys is required in the keyboard, such as the row *k1* seen in FIG. 6 (in which the second row *k2* does not appear in the view), and that only one selection drum, signal code drum, and associated elements are required. The ticket printing and issuing device may readily be converted during the assembly thereof to provide for the issuance of only regular tickets or only daily double tickets, as desired.

FIGS. 4 and 13 show mechanism for feeding out the printed tickets from the keyset device. A constantly rotating main motor M1, indicated in dotted outline in FIG. 4 and diagrammatically shown in FIG. 10, rotates a main shaft 124 which drives the mechanism of FIG. 13. Referring to the latter figure, the shaft 124 drives a gear train which rotates a shaft 126 which is continuously rotating. A pulley 128 on shaft 126 drives a belt 130 which in turn drives a pulley 132 on a shaft 134. The ticket exit roller assembly includes three constantly rotating rubber rollers 136, one of which is seen in FIG. 13, and three coacting pressure rollers of steel 138 (FIGS. 13 and 14). Feedout of a ticket is effected by

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causing the rollers 138 to be actuated momentarily into position to exert pressure on the edges of the ticket directly above the rubber rollers 136 and thus eject the ticket from the keyset device, i.e., from the right hand side of the roller assembly as viewed in FIG. 13. A ticket exit cam 140 mounted on a main cam shaft 161 has a cam follower 142 carried by a pivoted arm 143. The shaft 161 is driven in cycles through a one revolution clutch of known type identified by reference numeral 230 in FIG. 4, when a latch 231 is released by the energization of a clutch solenoid in response to an answer-back signal from the computer, as set forth hereinafter in the circuit description of FIG. 25. The clutch is driven through gears from the shaft 124 of the motor M1 of FIG. 4, and makes one revolution for the cycle of shearing, printing and issuing each ticket, after which the clutch is stopped by the latch 231.

Referring again to FIG. 13, the cam follower arm 143 and cam 140 actuate a link 144 to control a lever arm 149 which has a stud 148 adapted to be engaged by the end of lever or link 144 during its operation. A fixed pin 146 provides a guide pin for the link. The arm 148 is pivoted at, and is pinned to, a transfer shaft 150, as seen more clearly in FIG. 14. The turning movement of shaft 150 at the proper time under control of the ticket exit cam 140 will bring a pressure roller 138', FIG. 14, into pressure contact with the ticket whereby rollers 138' and 136', FIG. 16, feed out the ticket. The rollers 138, FIGS. 13, 14 and 17, are spring-loaded to keep them urged against the lower exit rollers (or the ticket between them) to insure positive ejection of the ticket. A driving pulley 154 on shaft 134 drives a pulley 155 through a belt 156 for rotating the exit roller 136', FIG. 16.

FIGS. 13 to 15 show the date wheel assembly 79 composed of year, month and day printing wheels mounted on a fixed shaft 158, the wheels being manually settable to show the date of issuance of a ticket which is the race date. FIG. 15 shows two print slugs 30 and 31 for printing the special code characters opposite the date and seen in the ticket of FIG. 3. These slugs are mounted on the ends of the shaft 158, but are pinned or otherwise secured against any rotational movement.

FIGS. 16 and 17 show mechanism for operating the inking roller 159. An inking cam 160 is operated in cycles by the main cam shaft 161 for controlling a cam follower arm 162. Prior to an inking operation the position of the arm is at the left; the figure shows the arm at the right which is after an inking operation has occurred. A carriage 164 is slidable on a guide rod 165, and the carriage has a bar 173 with a bifurcated end portion that freely slides along another guide rod 165' and prevents turning of the carriage as it is slid along the rod 165. The carriage 164 carries the ink roller 159 which is freely rotatable on a shaft 166. The roller is of felt or other suitable material and will retain a sufficient supply of ink to last for days.

A printing carriage 170 is slidably mounted on the guide rod 165', and carries a rotatable print roller 167 seen in FIGS. 16 and 23. The carriage has a bar 174, FIG. 16, with a bifurcated end portion that freely slides along the guide rod 165 and prevents turning of the carriage as it is slid along the rod 165'. In FIG. 23 there are shown a cam 175 and a cam follower arm 168 for moving the print carriage across the print field, the cam being rotatable by the shaft 161 during a print cycle. Shaft 161 also carries a pressure cam 176 which causes a cam follower 177 that acts through an adjustable link 178 to exert upward pressure on the end of a pivotally mounted arm 179. A roller 172 riding on the arm 179 causes upward pressure to be exerted on the rubber print roller 167 and hence on the under side of a ticket *t* to press the ticket against the type faces to effect printing. The cam follower arm 168 is shown in full line before printing, and in dot and dash outline at the end of a printing operation.

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FIGS. 18 and 19 show mechanism for advancing the ticket stock into position for printing. This comprises a ticket stock feed-in cam 180 rotated by the shaft 161 during the feed-in cycle. A cam follower 180' acts through an adjustable link to turn a gear 181, pivotally mounted at 192, through a limited arcuate movement. Gear 181 meshes with a gear 182 that is pinned to a collar 183, FIG. 18, forming part of a one direction clutch of known type which permits shaft 184 to rotate in only one direction. A detent device 185 prevents back lash. The ticket stock feed roller of rubber is keyed on the shaft 184 and is identified by reference numeral 194 in FIG. 20. A pressure roller 195 coacts with the roller 194 to feed in a predetermined length of the ticket stock *t'* sufficient to form a ticket.

FIGS. 20 to 22 show means for cutting or shearing the ticket stock to form the tickets. A cam 186 for operating the shearing mechanism is rotated by the cam shaft 161, and through cam follower arm 187, pivoted at 187a, operates a link 188. The link is pivotally connected to a movable shearing blade 189 pivotally mounted at 190 and which coacts with a fixed shearing blade 191. Blade 189 cuts as it is moved upwardly; the cutting edge of 189 is its upper edge as viewed in FIG. 21, and the lower edge of 191 is its cutting edge.

As may be noted from the ticket issue time chart of FIG. 5, prior to a printing operation the movable shear blade 189 is up (as seen in FIG. 21). In the sequence of operation the type faces are inked by the roller 159 which remains for a period over at its right-hand position, as viewed in FIGS. 16 and 17, since its cam follower 162 is on the dwell portion of the cam 160. The movable shear blade is now brought down to the dotted line position shown in FIG. 21. The ticket strip is then fed in, and blade 189 is quickly moved up to cut the ticket, the blade remaining up. The print roller 167 is then raised up against the ticket and moved across to the right to effect printing. The print roller is then brought down and returned back to the left, and the ticket is ejected, and the inking roller 159 is returned to its initial position. In the chart the numerals above the various chart lines represent degrees of rotation, and the numerals below the chart lines represent time intervals in milliseconds.

FIG. 7 shows suitable mechanism for latching the operated keys of the keyboard and for releasing the operated keys in response to an answer-back signal from the computer in the manner referred to in the description of the circuit drawing of FIG. 25. In FIG. 7 it is seen that each key lever has a pin 240 which engages an associated latch arm 242, the latch arms of the key levers being secured to a rod 244 and rotatable therewith. The lower end of each latch arm has a cam surface which bears against the pin 240 when the key is unoperated. When a key is depressed the pin in its key lever causes the latch assembly to rotate slightly in a counterclockwise direction, against the tension of a biasing spring 247, until the pin 240 enters a notch or shoulder portion 246 and the latch returns to hold the key lever down. A link or arm 248, with the left-hand end thereof secured to the pivotal rod 244, and the right-hand end thereof pivoted on a stud 249, operates to rotate the rod 244 and release the latches 242 when an arm 252 is raised up by rotation of an arm 250 of the Reset Solenoid RS, and thus release any operated key. The key lever seen in FIG. 7 is the CLEAR lever and it operates a CLEAR KEY SWITCH for purposes explained hereinafter.

In order to prevent more than one key in each bank of keys from being operated at any one time, the key levers coact with steel balls 260 contained in a channel 262, as seen more clearly in FIG. 6. The diameter of each ball is such that only one key lever may be entered between adjacent balls at any one time. Other means for preventing the operation of more than one key at a time may, of course, be employed.

Keyset control circuit

FIGS. 25 and 26 together comprise a schematic circuit diagram showing the controls for the keyset adapted to issue "daily double" betting tickets. It will be seen that the circuit operates with relatively few relays and electromagnets, and this reduces the possibility of electrical trouble or failure. In the diagram the relay contacts are shown detached from the relay windings to simplify tracing the circuits; the relay windings are given letter designations generally indicating their functions, and their associated contacts are identified by the same letter designations as the relays, followed by a number of identifying the individual contacts.

The manual operation of a key in each of the two rows of keys will cause the associated selecting levers to move into the paths of their corresponding stop pins on the selection drums to stop the drums, and hence stop the two code drums Nos. 1 and 2 (diagrammatically shown in the left-hand portion of the figure) in proper position for producing the code signals representing the identifying numbers of the two horses selected by a bettor for the daily double in the coming race.

As each of the selection drums is stopped, the force exerted on the operated selection lever causes a bracket member to rotate to a position where it actuates an associated microswitch, referred to as Motion Detector Switches #1 and #2 (MDSW1 and MDSW2). As each MDSW operates, it in turn operates an associated Motion Detector Relay MDR1 or MDR2 over a circuit comprising a bus 200 and a conductor 201, through the closed contacts of the microswitches and the windings of the motion detector relays to a grounded bus 203.

When the first motion detector relay MDR1 operates, it opens the normally closed contacts 2 of MDR1 and removes a negative potential of -6 volts normally applied to a conductor 14 which is an outgoing circuit leading to the computer and used to signify that a number representing a particular horse in the coming race has been set up in the keyset. When the conductor 14 has -6 volts potential thereon, this indicates to the computer that the keyset is available for entering a bet, and when the conductor is opened at contacts 2 of MDR1 or MDR2 this indicates to the computer that the keyset is in the process of entering a bet. The operation of MDR1 also closes one pair of contacts 4 in a series circuit comprising two pairs of such contacts on MDR1 and MDR2 and leading to a conductor 206 which is common to the two signal code drums #1 and #2. When both motion detector relays are operated, by a daily double selection set up in the keyset, both pairs of contacts 4 are closed and the common conductor 206 applies signal current of -6 volts through the contact brushes *b'* to the bodies of the metal drums for sending out the code signals from the longitudinally extending rows of coded conducting and nonconducting areas on which the rows *b* of contact brushes rest in the selected stopped positions of the drums. The number of coded areas in each row across the drums engaged by the brushes *b* will depend upon the number of permutation code signals required for the maximum number of horses in any race; the six brushes indicated in each row for coding purposes will give a corresponding number of useful unique permutations.

As soon as the computer has received and accepted the code signals transmitted over conductors in a cable 10, it energizes a relay 16, FIG. 1, associated with the calling keyset, and the closure of the relay contacts causes an answer-back, or revertive control, signal of negative polarity to be sent over conductor 12 and through the closed contacts RR3 of a release Relay RR to energize a Clutch Relay CR. A diode 209 in conductor 12 prevents feedback from the keyset circuitry. CR operates and closes its contacts CR6, FIG. 26, to energize the Clutch Release Solenoid CS which releases the latch 231,

FIG. 4, and starts the one revolution clutch operation to effect printing and ejection of the ticket.

Energized relay CR closes its contacts 2 to provide a self-locking circuit comprising a conductor 210, closed contacts 2, and the normally closed contacts 3 of a cam-operated switch CSLSW which is controlled by a cam on one of the driven shafts of the keyset device. Relay CR is locked up until the cammed switch CSLSW operates momentarily, towards the end of an operating cycle, which action opens the locking circuit 210 and releases CR and, through the blade and upper contact 1 of CSLSW and conductors 212 and 213, energizes a Release Relay RR. The operation of RR at its contacts RR2 immediately opens the Code Drum circuit 206, and at its contacts RR3 opens the answer-back circuit 12. At its contacts RR4 the operation of the release relay energizes, over conductor 215, the Release Solenoid RS, but only if the Clutch Relay has been released and its contacts CR5 are closed.

The operated release relay RR provides its own holding circuit at its now closed contacts RR6 so long as contacts 3 of motion detector relay MDR1 or MDR2 remain closed, the holding circuit including conductors 201 and 218. The basic function of the release relay RR is to operate the release solenoid RS which, in turn, releases the operated key or keys and permits the selector drum or drums to resume their rotation. As each key is reset, the associated switch MDSW releases and deenergizes the associated relay MDR1 or MDR2 and opens each of the two holding paths 201 and 218 for the release relay RR.

When both keys are reset, and both drums are spinning again, Relay RR is released, unless a ticket jam has occurred, in which event RR is held operated over conductor 220 and the EXIT SWITCH which closes until the jam has been cleared. The resetting of both of the keys recloses the series circuit 204 of MDR1 and MDR2 to indicate transmission completed and machine reset. During a jam, since release relay RR is operated and its contacts RR2 are open, no code signal can be sent. This means that no acknowledgment will be received, and no printing can occur.

In the event that a ticket seller operates an "inoperative" key, that is, one for which there is no corresponding horse entered in the race, or if a corresponding horse has been scratched so that the computer cannot send a confirm signal, the closure of the contacts of a CLEAR KEY SWITCH by the operator causes current from the bus conductor 200, conductor 201, through the key, and conductor 213 to energize the release relay RR and restore the key to its unoperated position.

The operation of the TEST KEY, by mechanical linkage, stops both Code Drums #1 and #2 each in a position such that a "disallowed" signal appears on the drums, and is recognized by the computer as such so no confirm signal is given by the computer. The word "Test" or equivalent designation appears in one of the print positions on the print wheels bearing the horse designations, and the test designation will be printed on an issued ticket for test purposes without involving the computer. The circuit of the Test Key includes the winding of the clutch relay CR, closed contacts of the test key, closed contacts 5 of MDR1 and MDR2, and the closed contacts 3 of the cam-operated switch CSLSW.

FIG. 26 shows a circuit for enabling all of the race number wheels 75 to be stepped simultaneously before each race. The alternating current power supply 222 is normally not applied to motor M3 (shown in detail in FIG. 11) since the contacts of the cam-operated switch are normally held open. Prior to each race, however, an attendant at the console of the pari-mutuel computer closes the switch 20, FIG. 1, for a short interval of time and this supplies the alternating current power to the motors M3 of all the keyset devices, over conductors 18 and 19, to start the motors for the stepping operation,

after which the cam-operated switches 87 close their contacts to maintain power to the motors to complete their stepping operation, whereupon their associated cams again open the switches 87 to stop the motors.

The embodiment disclosed herein is for the purpose of illustrating the principles of the invention and one mode of application thereof, and various changes and modifications may be made without departing from the spirit of the invention which is not to be regarded as limited except as indicated by the scope of the appended claims.

What is claimed is:

1. A keyset-controlled ticket printing and issuing device comprising a set of manually operable keys respectively representing different items of data to be printed on the tickets as issued, means for holding a supply of ticket stock, a print wheel having a series of print characters thereon for printing said different items of data on the tickets, a rotatable selection member having a series of stop pins respectively corresponding to said keys, drive means including a continuously rotatable shaft and a slip clutch for rotating said selection member and print wheel in unison, said keys having associated selecting levers normally positioned out of the path of travel of said stop pins and each movable into the path of a corresponding stop pin when the associated key is operated to stop the rotating selection member and printing wheel in proper position to print the data represented by the operated key, said slip clutch enabling these members to stop notwithstanding the continued rotation of said shaft, means for advancing a predetermined length of ticket stock into the printing position, means for severing the advanced length of ticket stock to form a ticket, means for causing the selected data on the printing wheel to be printed on the ticket, and means for issuing the printed ticket.

2. A keyset device in accordance with claim 1, in which said selecting levers are spaced laterally in a row and said selection member has a longitudinal axis about which it rotates, said stop pins being positioned around the outer surface of the selection member and axially spaced along the member so that during rotation thereof the pins respectively move into alignment with the selecting levers thereby to cause a particular pin to engage the selecting lever of an operated key for stopping the selection member and printing wheel in position to print the selected data item.

3. A keyset device in accordance with claim 2, in which said stop pins are arranged in a spiral path around the outer surface of the selection member to determine the successive stopping positions of the rotatable selection member and printing wheel.

4. A keyset controlled ticket printing and issuing device comprising a set of manually operable keys respectively representing different items of data to be printed on the tickets as issued, a print wheel having a series of print characters thereon for printing said different items of data on the tickets, a rotatable selection member having a series of stop pins respectively corresponding to said keys, drive means comprising a continuously rotatable motor-driven shaft for rotating a driven shaft through a slip clutch, said driven shaft rotating said selection member and print wheel in unison, said keys having associated selecting levers normally positioned out of the path of travel of said stop pins and each movable into the path of a corresponding stop pin when the associated key is operated to stop the rotating selection member and print wheel in position to print the data represented by the operated key, said slip clutch enabling these members to stop notwithstanding continued rotation of said first named shaft, and means for preventing movement of the print wheel during a printing operation comprising a bracket having a rod on which said selecting levers are pivotally mounted, said bracket also being pivotally mounted to provide limited movement thereof between two fixed stop pins, the force exerted on a selecting lever

of an operated key by the continued rotation of said first named shaft causing said bracket to be urged against one of its two fixed stop pins and thereby hold the print wheel against movement during printing.

5. A device in accordance with claim 4, including a ratchet wheel on said driven shaft and a back-stop pawl for engaging a tooth of the ratchet wheel in any stopped position of the selection member and print wheel to prevent rebound when these members are stopped by said selection lever and stop pin.

6. A keyset-controlled ticket printing and issuing device comprising a set of manually operable keys respectively representing different items of data to be printed on the tickets as issued, a print wheel having a series of print characters thereon for printing said different items of data on the tickets, a rotatable selection member having a series of stop pins respectively corresponding to said keys, drive means comprising a continuously rotatable motor-driven shaft for rotating a driven shaft through a slip clutch, said driven shaft rotating said selection member and print wheel in unison, said keys having key levers for engaging associated selecting levers and normally operative to hold the selecting levers out of the path of travel of said stop pins and each movable into the path of a corresponding stop pin when the associated key and its key lever is operated to stop the rotating selection member and print wheel in position to print the data represented by the operated key, said slip clutch enabling these members to stop notwithstanding continued rotation of said first named shaft, and means for preventing movement of the print wheel during a printing operation comprising a bracket having a rod on which said selecting levers are pivotally mounted, said bracket also being pivotally mounted to provide limited movement thereof between two fixed stop pins, the force exerted on a selecting lever of an operated key by the continued rotation of said first named shaft causing said bracket to be urged against one of its two fixed stop pins and thereby hold the print wheel against movement during printing.

7. A race track pari-mutuel system comprising: a plurality of keyset devices for printing and issuing tickets prior to each race, each of said keyset devices having manually operable keys and a first print wheel with a first series of printing characters thereon respectively identifying the individual contestants entered in a forthcoming race; each keyset device also having a plurality of mechanically operated selecting members controlled by the operation of a key for selectively rotating said first print wheel to a position for printing on a betting ticket an identifying character representing a bet on a particular contestant; each of said keyset devices also having a second print wheel having race code identification characters thereon for identifying each race; each of said keyset devices also having electrically operated stepping means for stepping each of said second print wheels upon receipt of an electrical signal to a different position, each of said electrically operated stepping means including an electrical motor having a shaft connected to said second print wheel, a cam on said shaft, a cam operated switch operatively disposed with respect to said cam and means for initially energizing said motor in response to the received electrical signal under control of said cam operated switch; and central electrical signal generating means for transmitting electrical signals to the electrically operated stepping means of each of said keyset devices prior to the start of a race.

8. A race track pari-mutuel system comprising: a plurality of keyset devices for printing and issuing tickets prior to each race, each of said keyset devices having manually operable keys and a first print wheel with a first series of printing characters thereon respectively identifying the individual contestants entered in a forthcoming race; each keyset device also having a plurality of mechanically operated selecting members controlled by the operation of a key for selectively rotating said first

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print wheel to a position for printing on a betting ticket an identifying character representing a bet on a particular contestant; each of said keyset devices also having a second print wheel having race code identification characters thereon for identifying each race; each of said keyset devices also having electrically operated stepping means for stepping each of said second print wheels upon receipt of an electrical signal to a different position, each of said electrically operated stepping means including an electrical motor having a shaft connected to said second print wheel, a cam on said shaft, a cam operated switch operatively disposed with respect to said cam, a source of electrical energy, circuit means for controlling the transmission of electrical energy from said source to said electrical motor by said cam operated switch and means for transmitting the electrical signal to said electrical motor to initially start said electrical motor, said cam

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operated switch connecting said electrical motor to said source when said shaft reaches a first position of rotation and disconnecting said electrical motor from said source when said shaft reaches a second position of rotation; and central electrical signal generating means for transmitting electrical signals to the electrically operated stepping means of each of said keyset devices prior to the start of a race.

References Cited by the Examiner

UNITED STATES PATENTS

2,526,512	10/1950	Snell et al.	235—92
2,691,342	10/1954	Johnston et al.	235—92

15 ROBERT E. PULFREY, *Primary Examiner*.

NATHANIEL A. HUMPHRIES, *Assistant Examiner*.