

Aug. 27, 1957

D. C. ROCKOLA

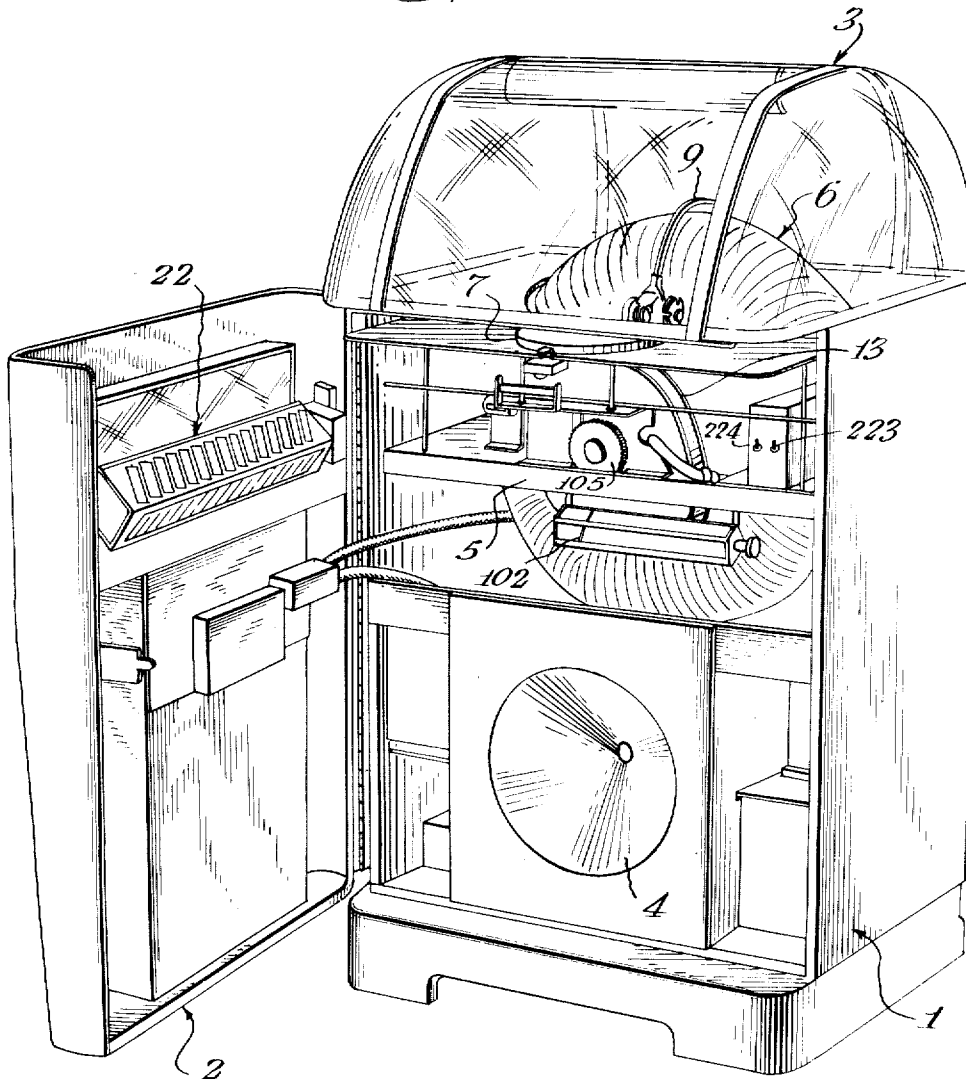
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Fig. 1.



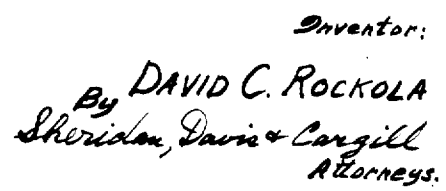
Inventor:

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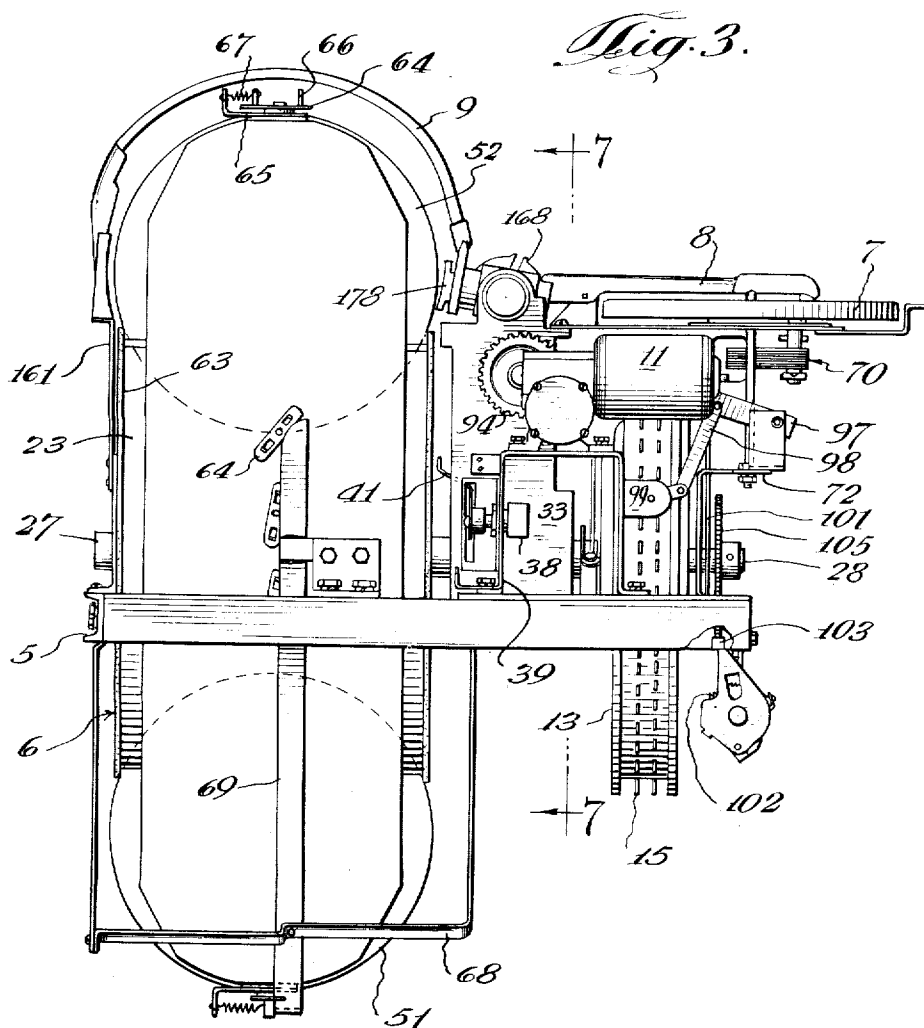
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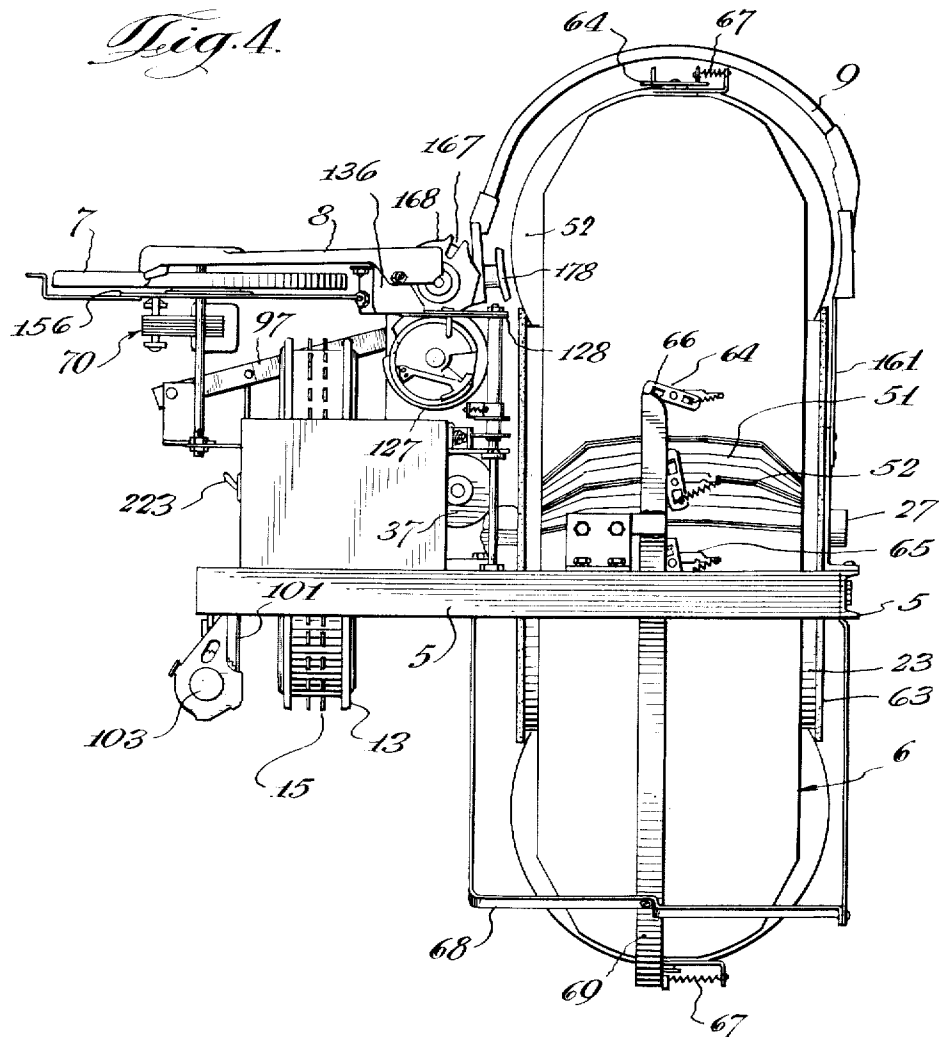
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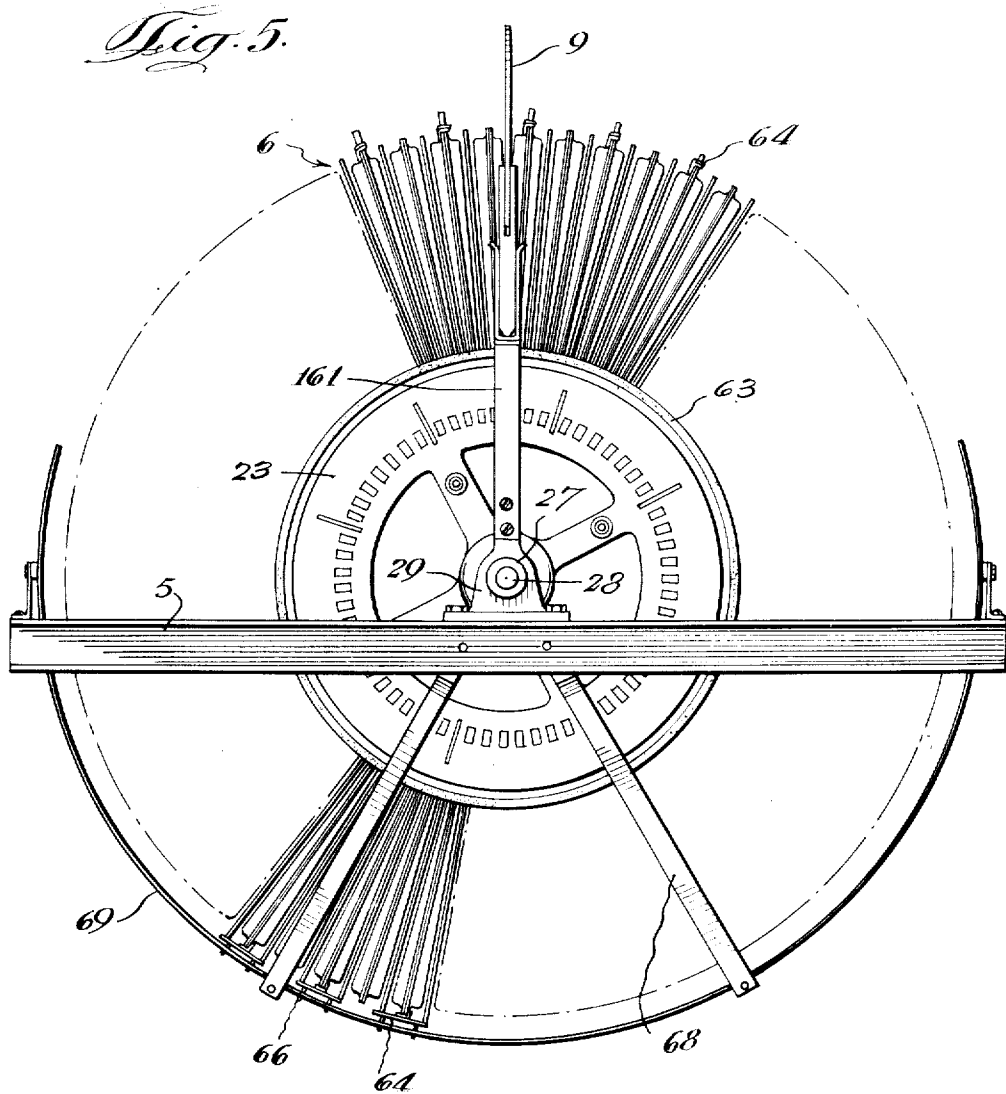
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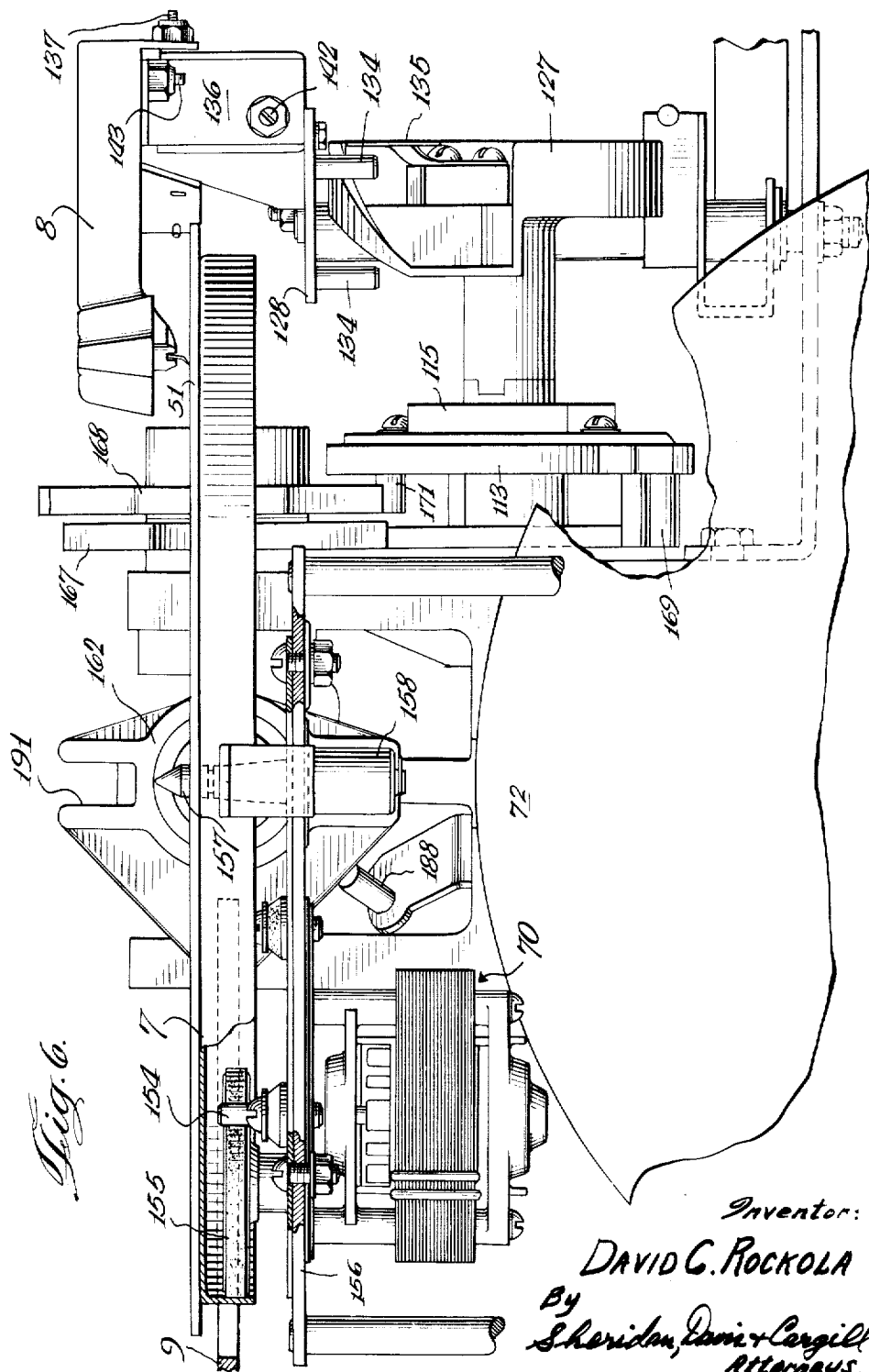
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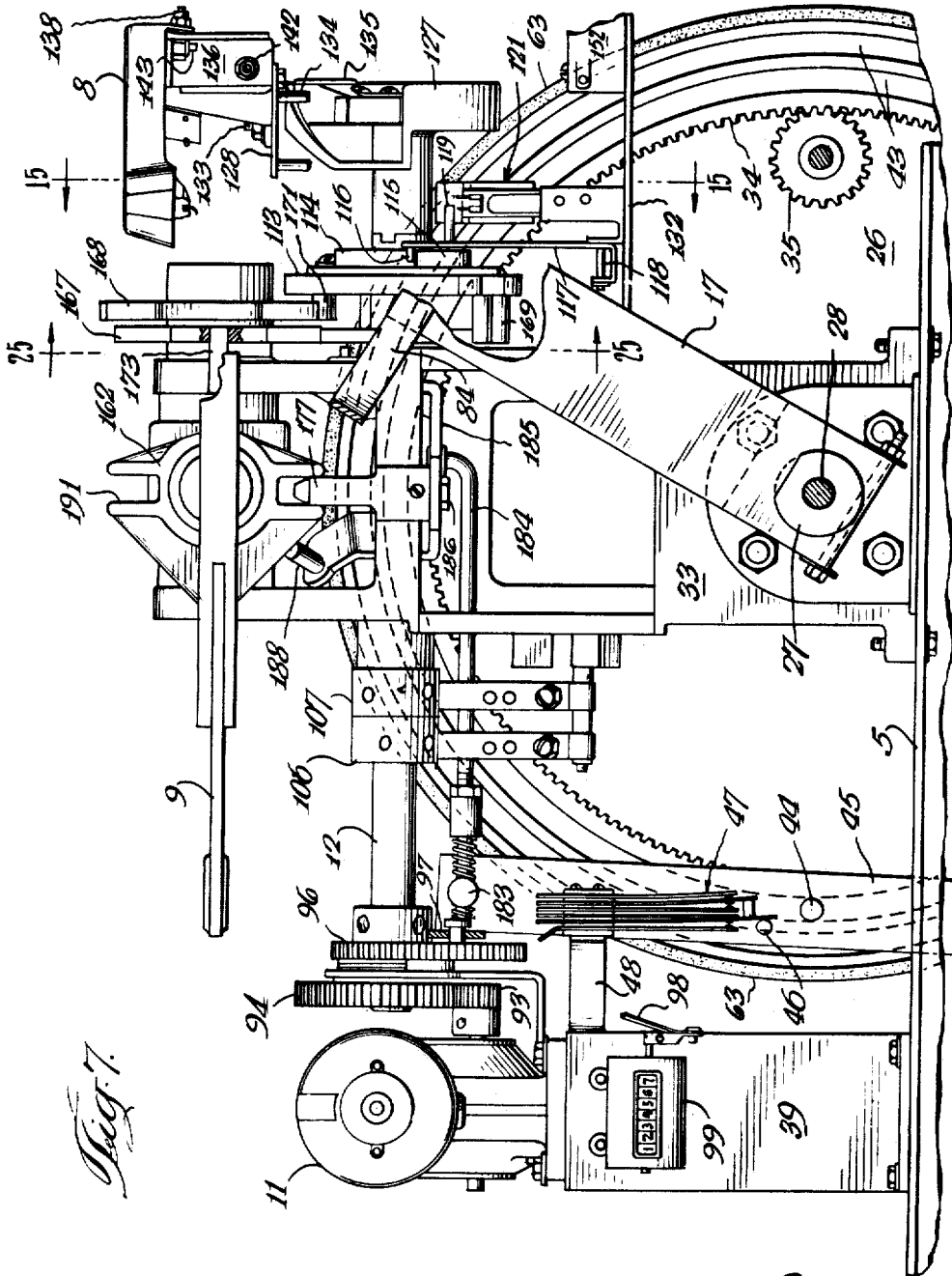
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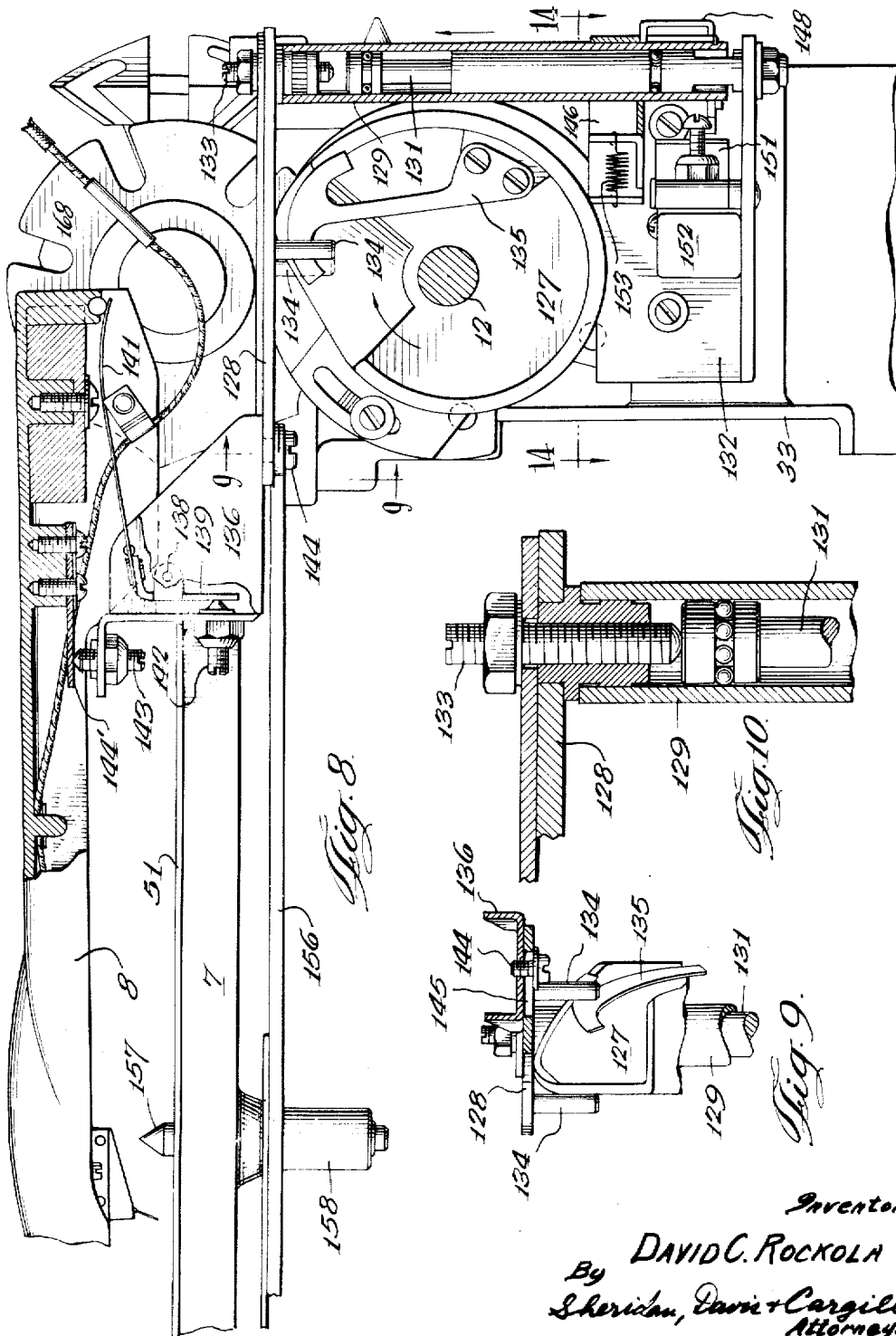
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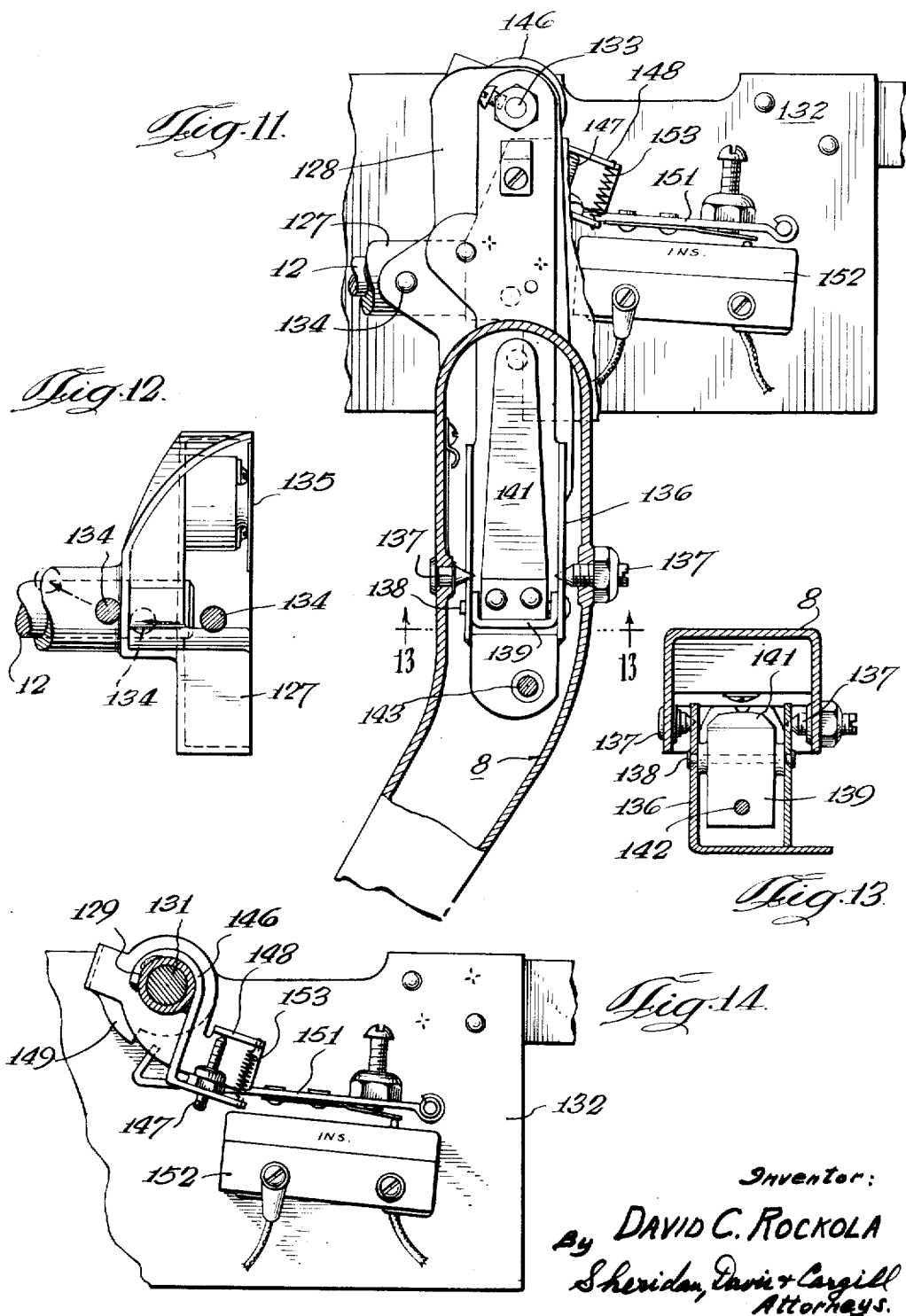
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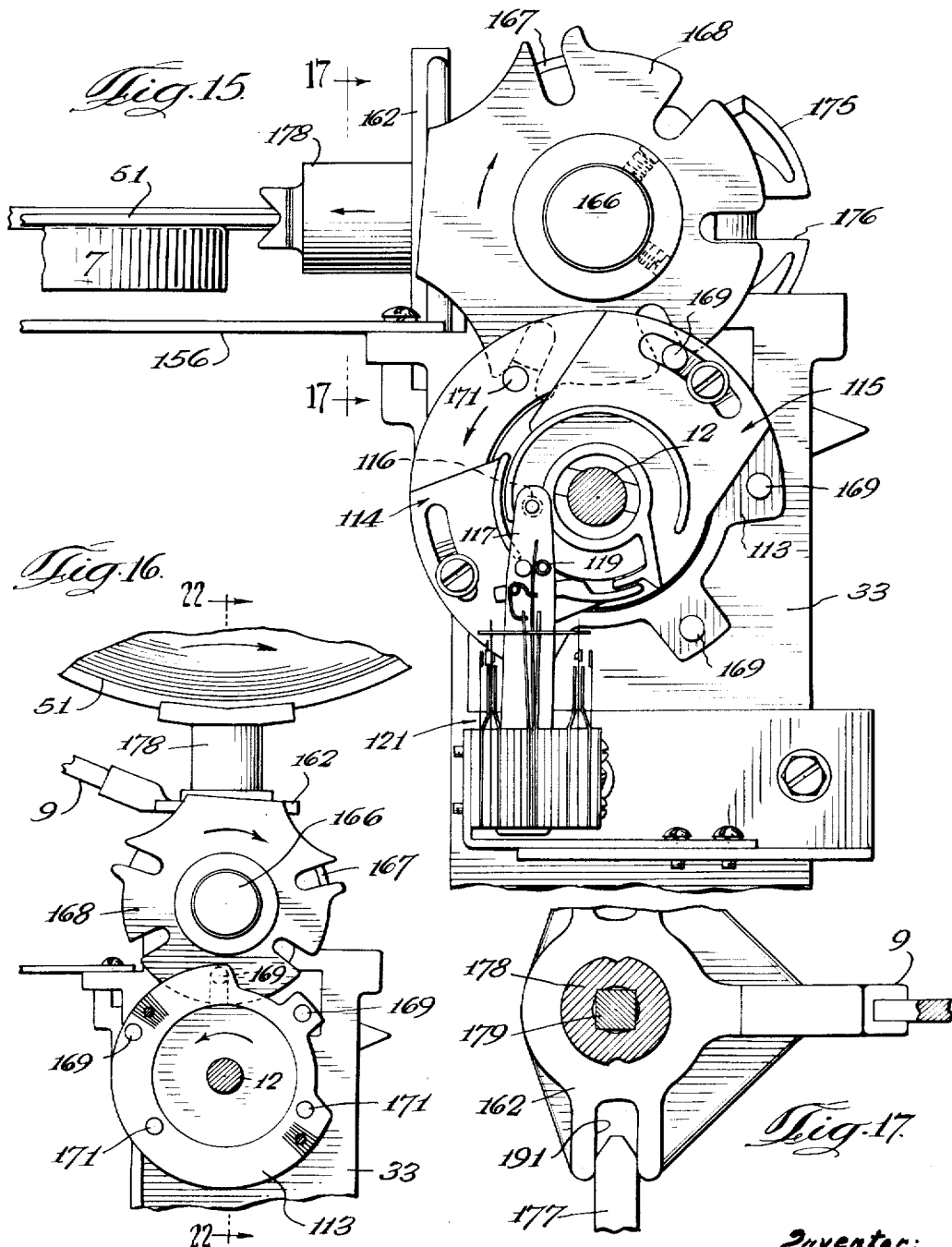
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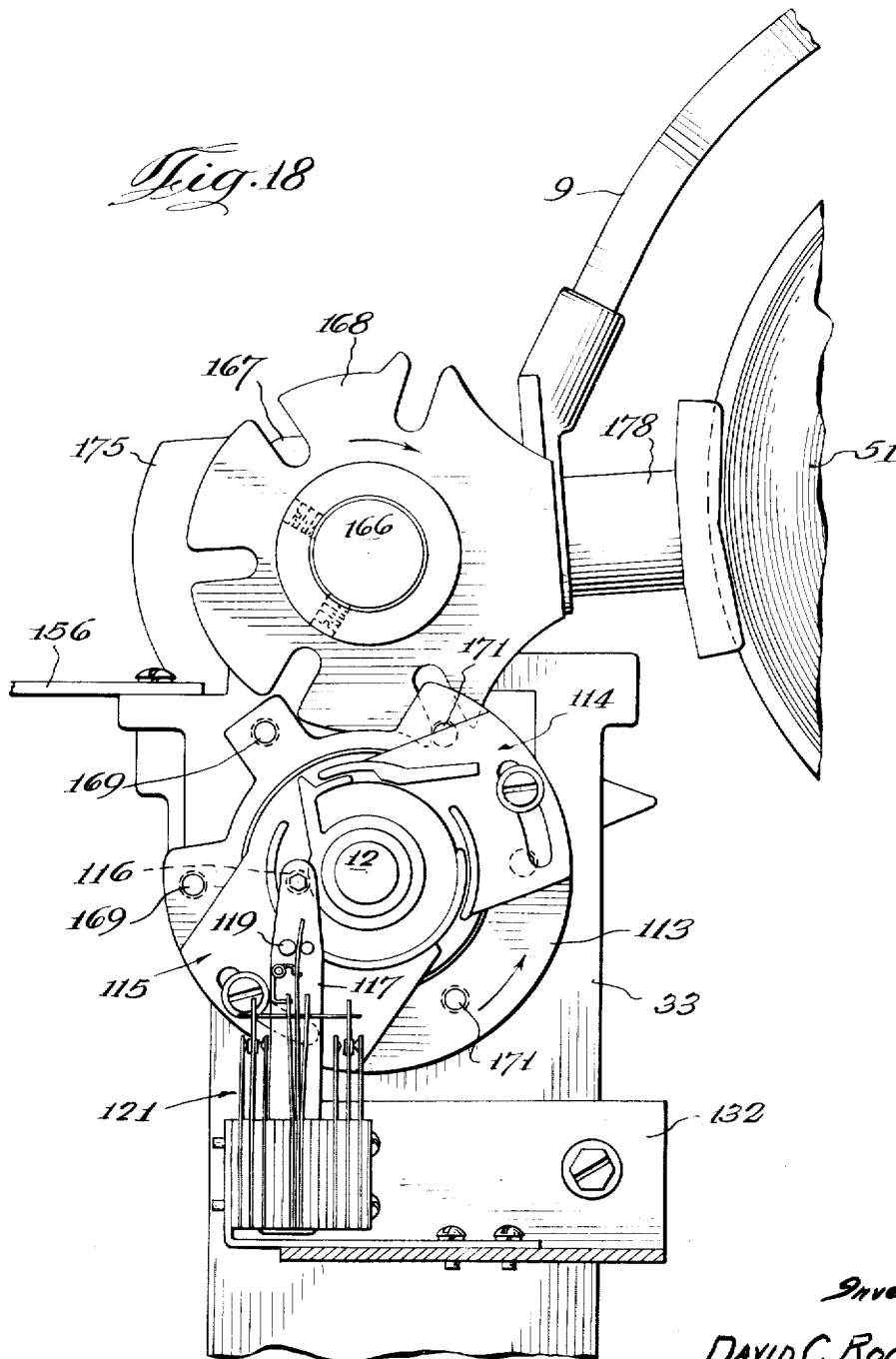
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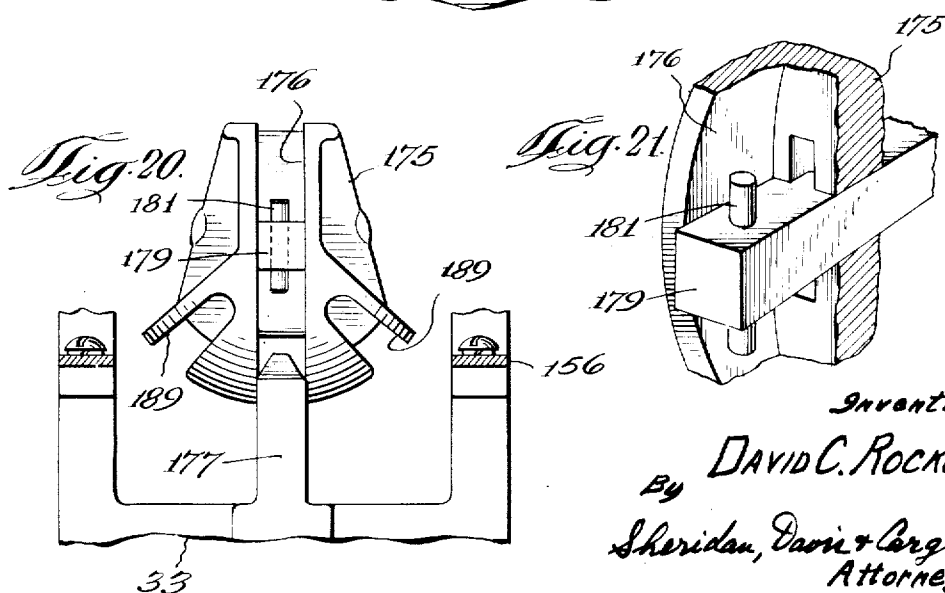
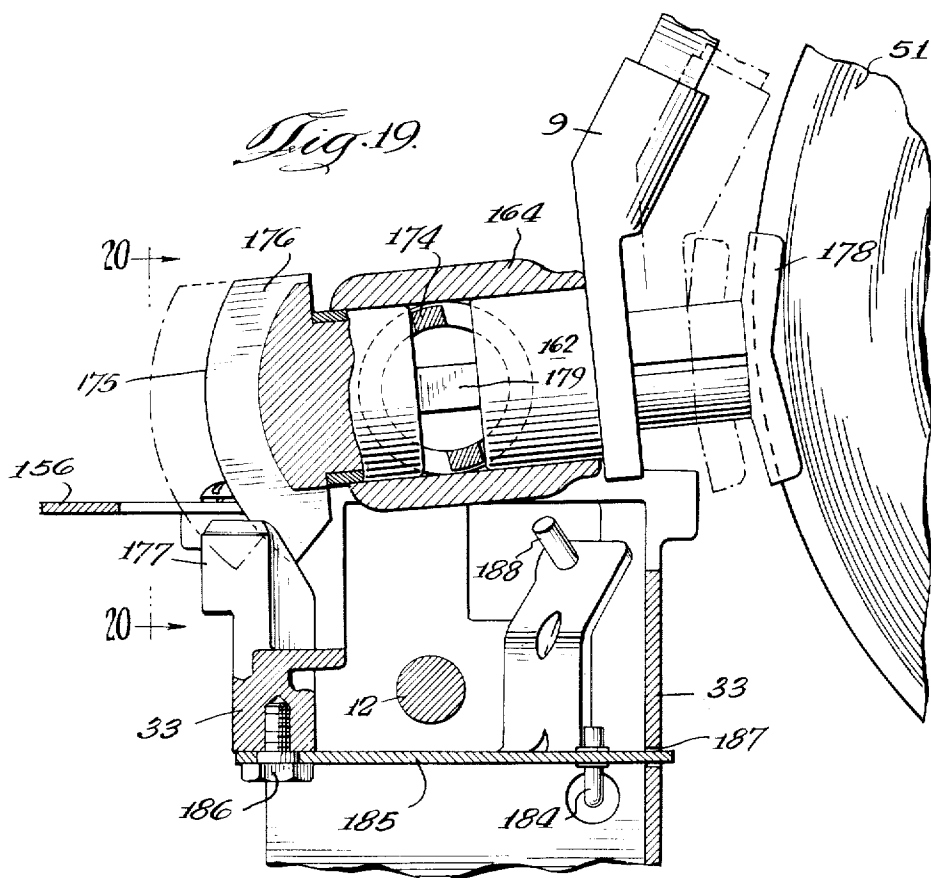


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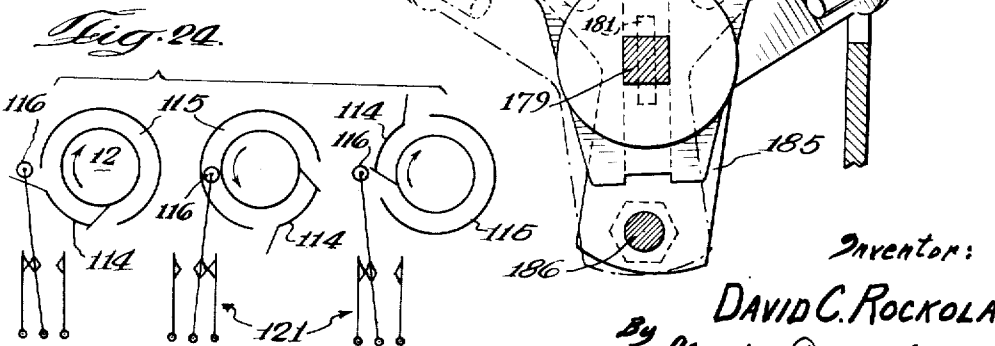
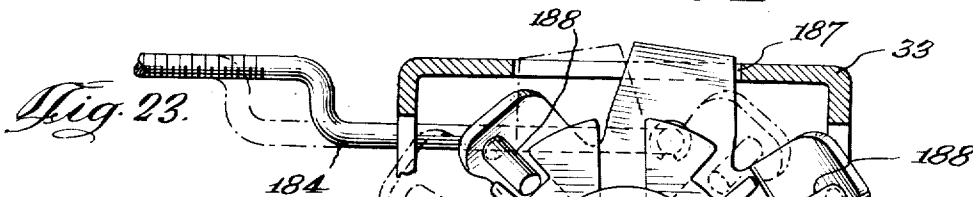
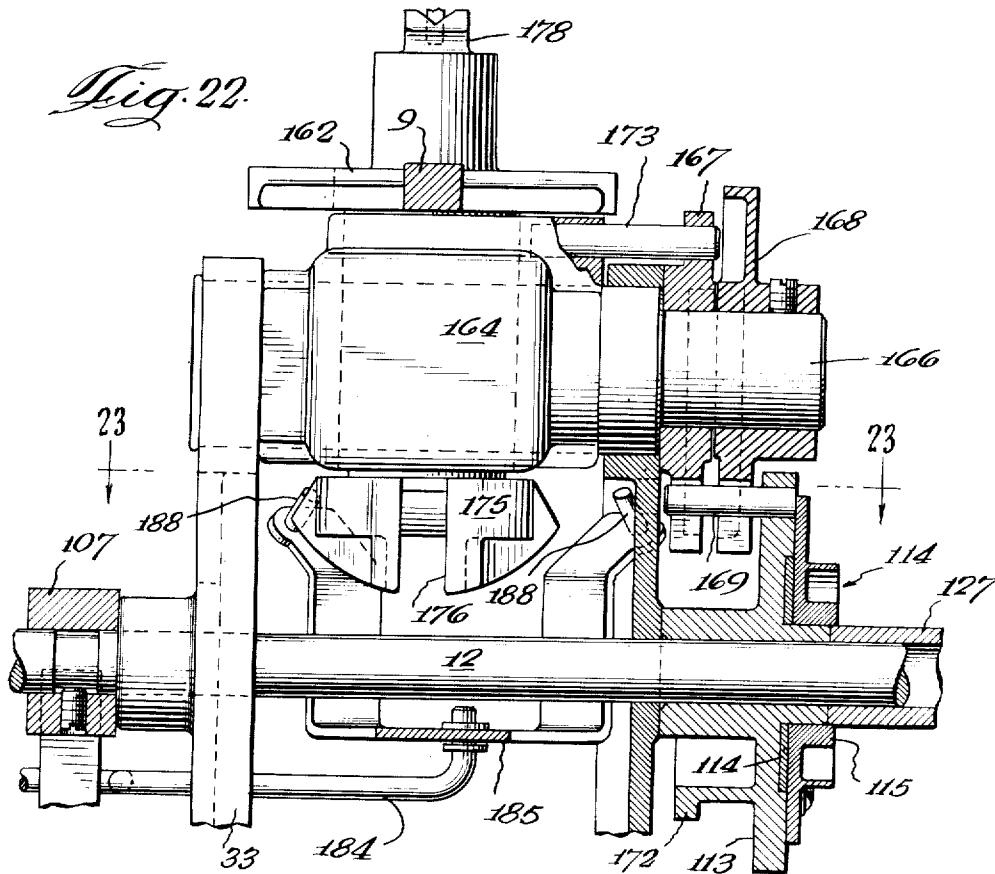
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Fig. 25.

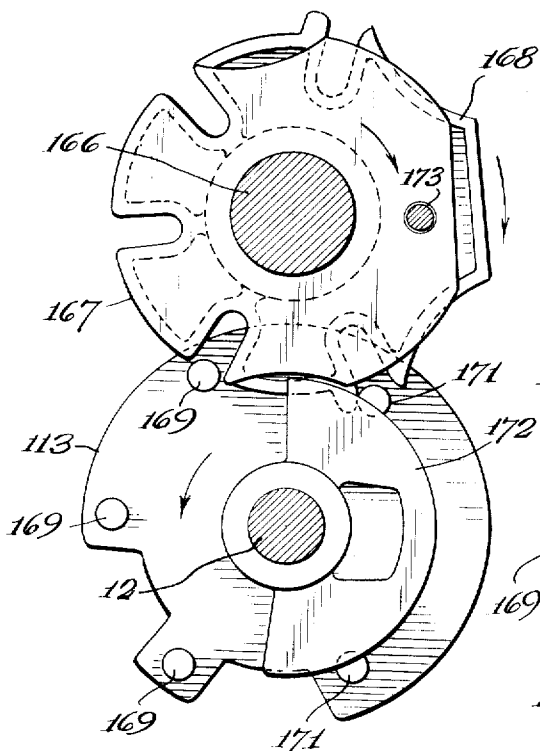


Fig. 26.

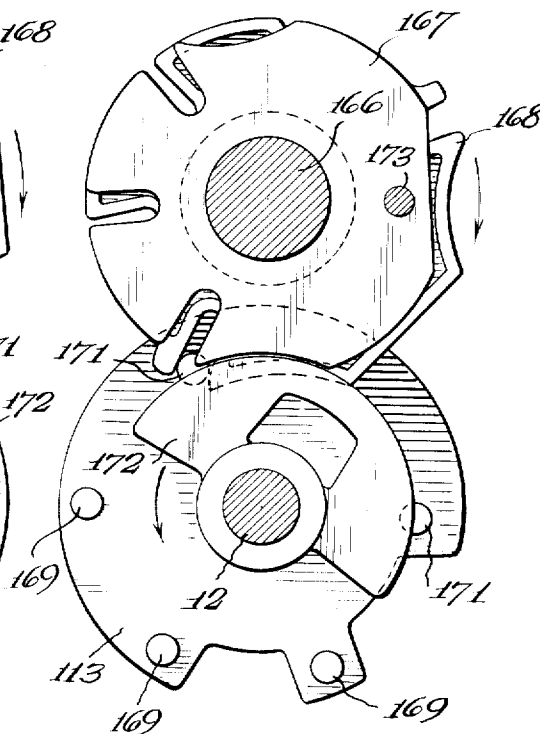


Fig. 27.

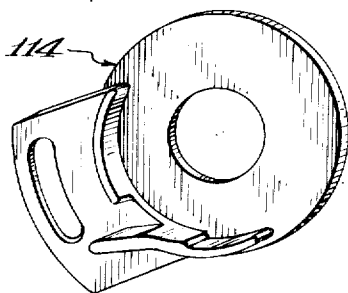
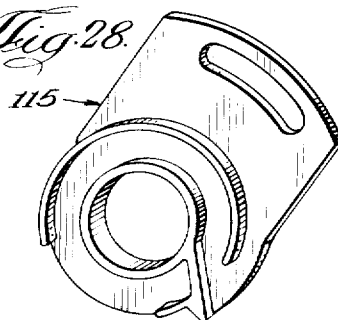


Fig. 28.



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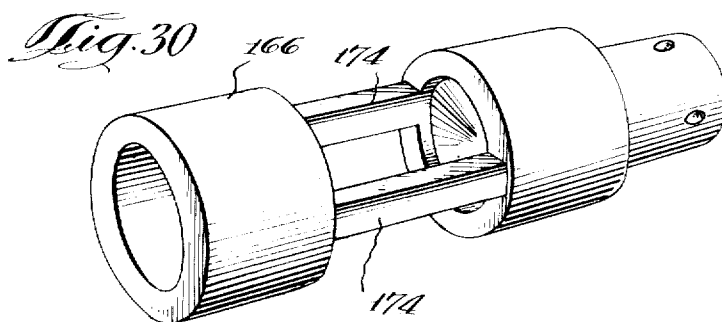
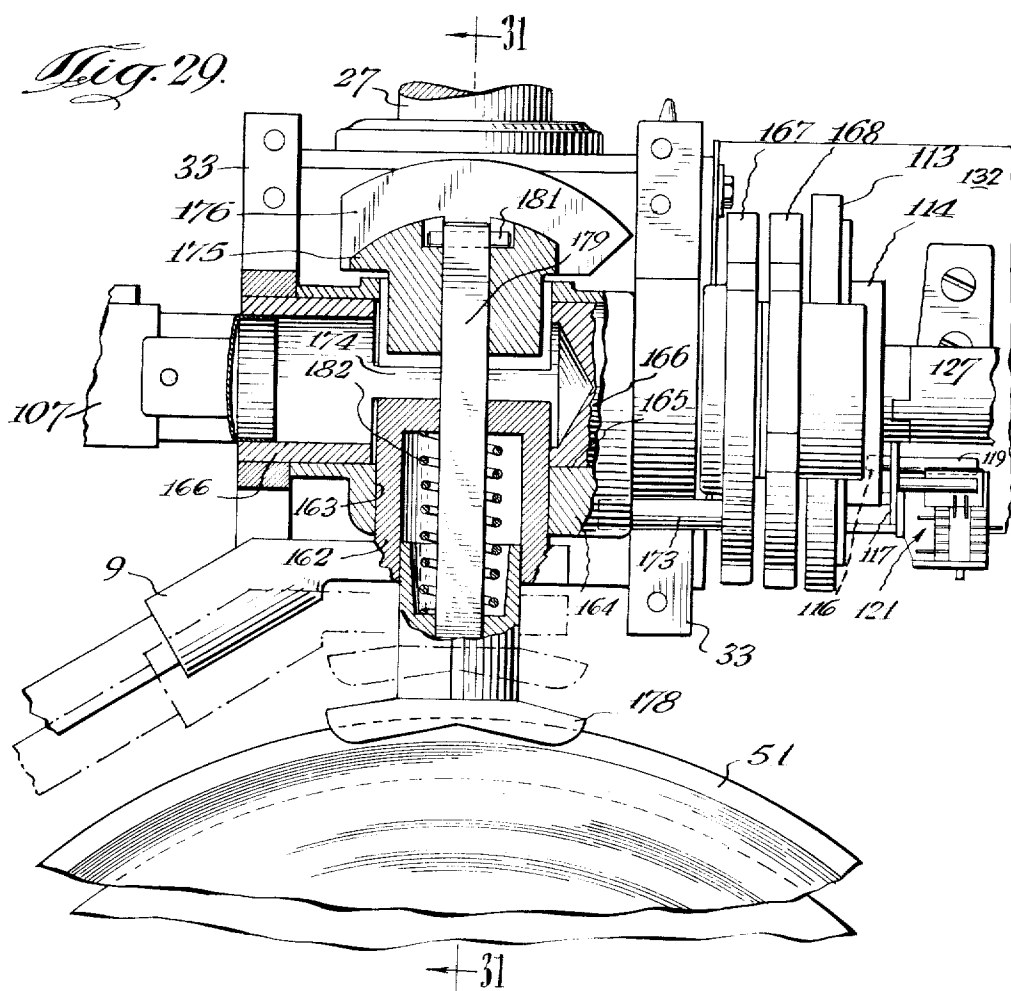
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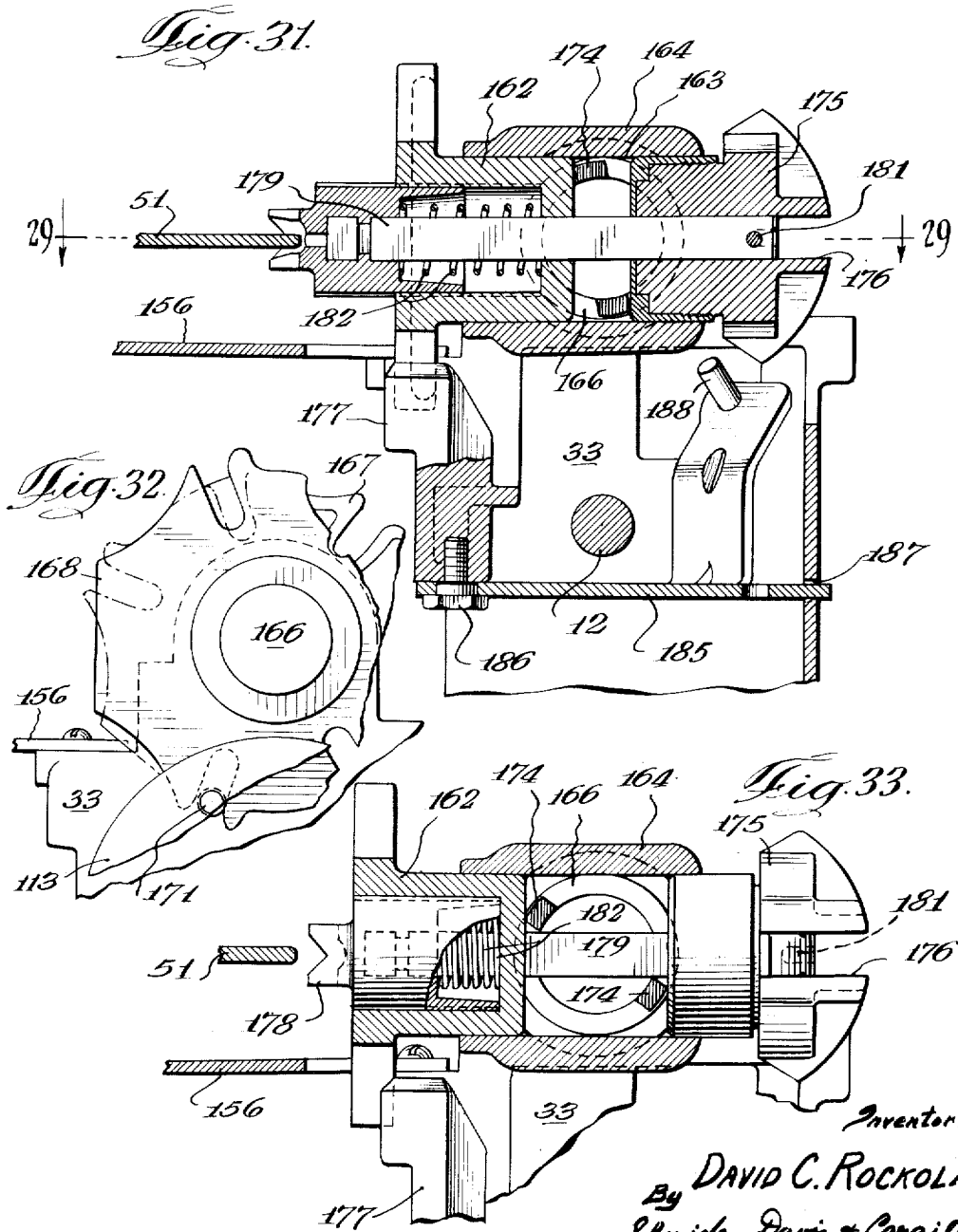
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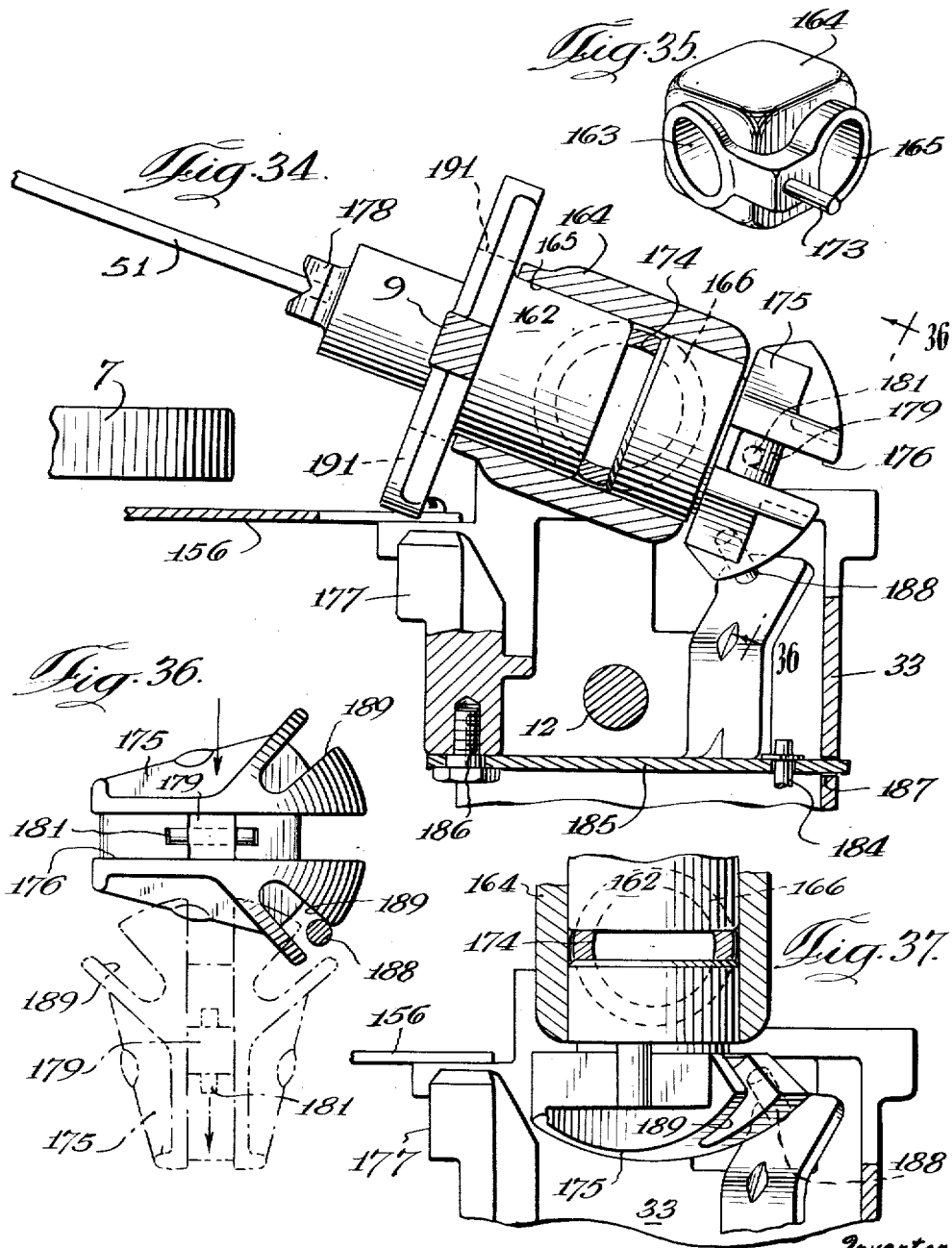
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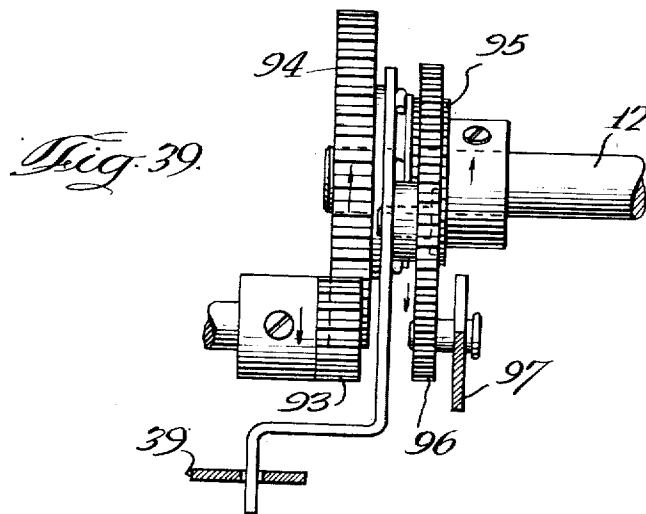
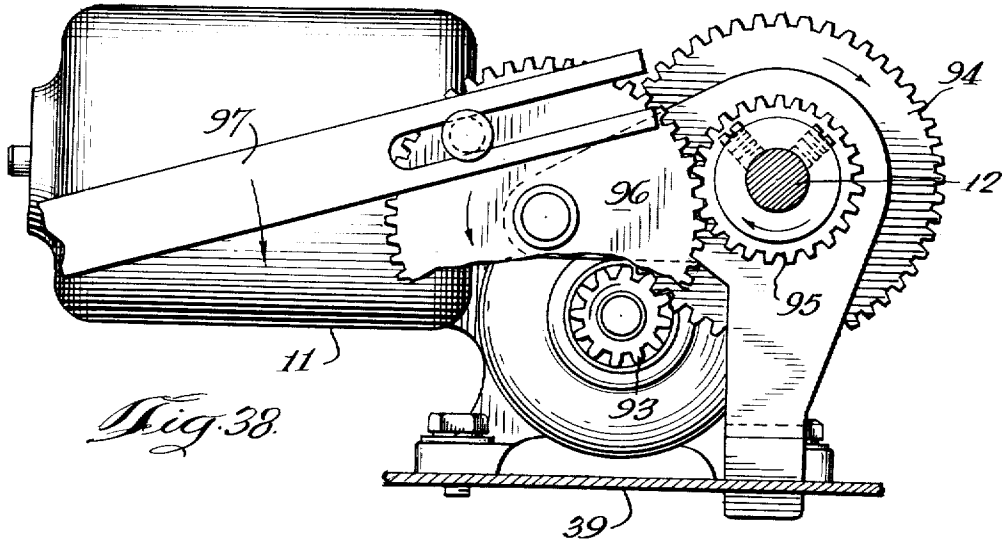
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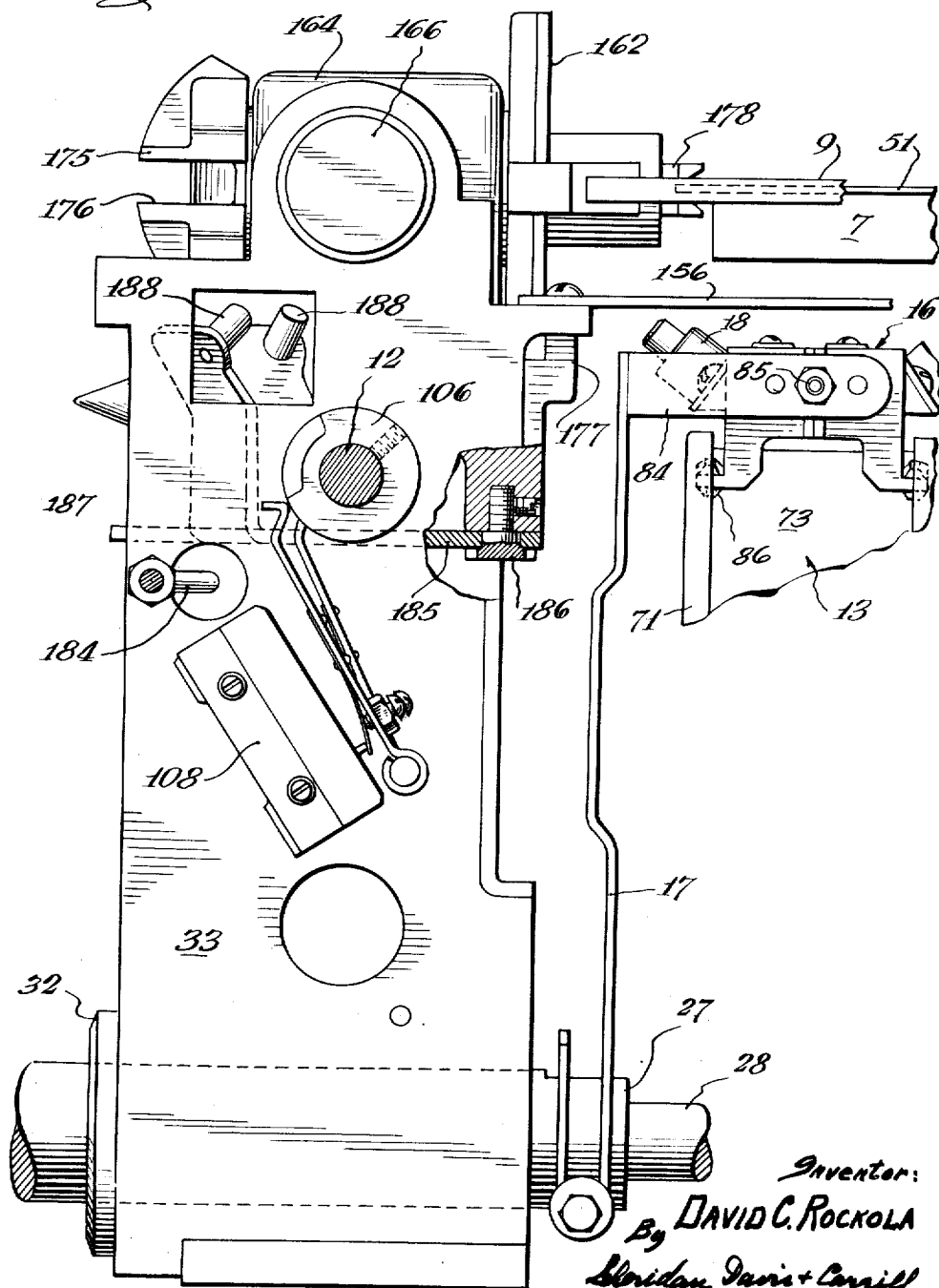
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Fig. 40.

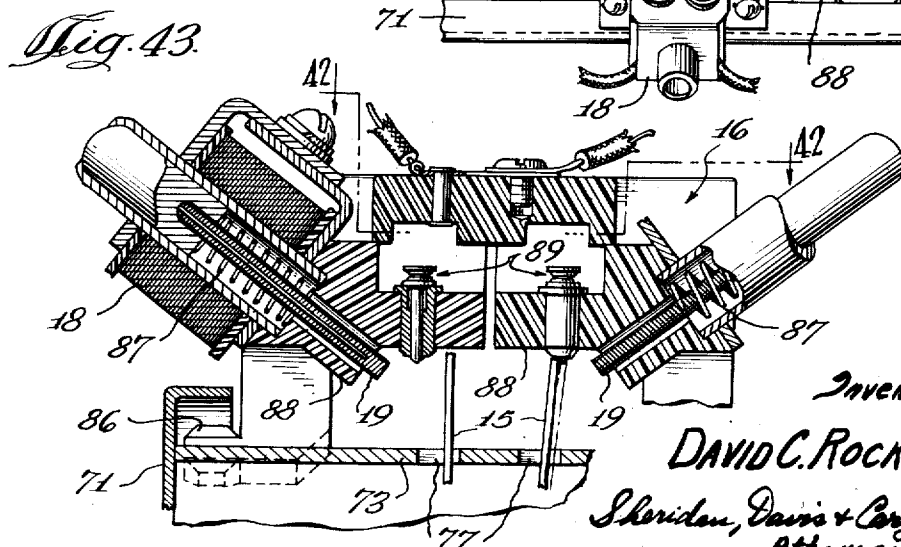
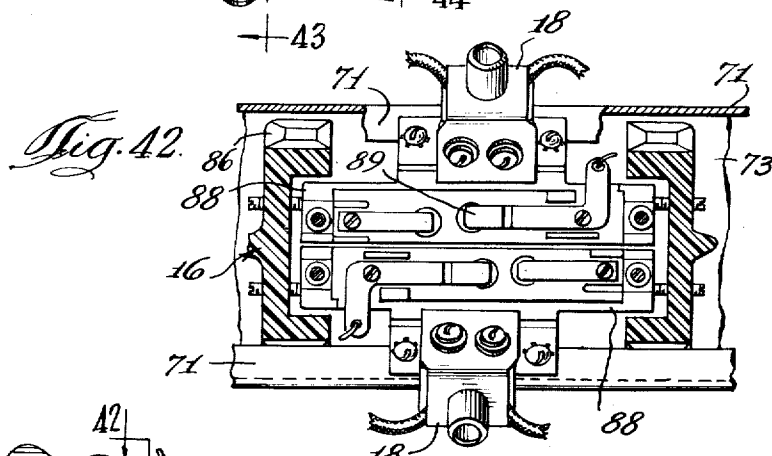
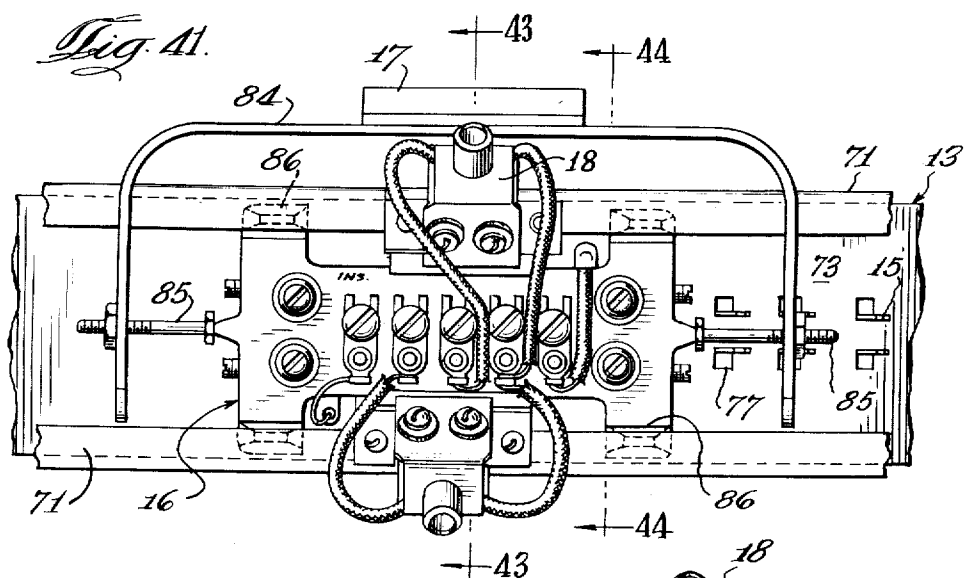


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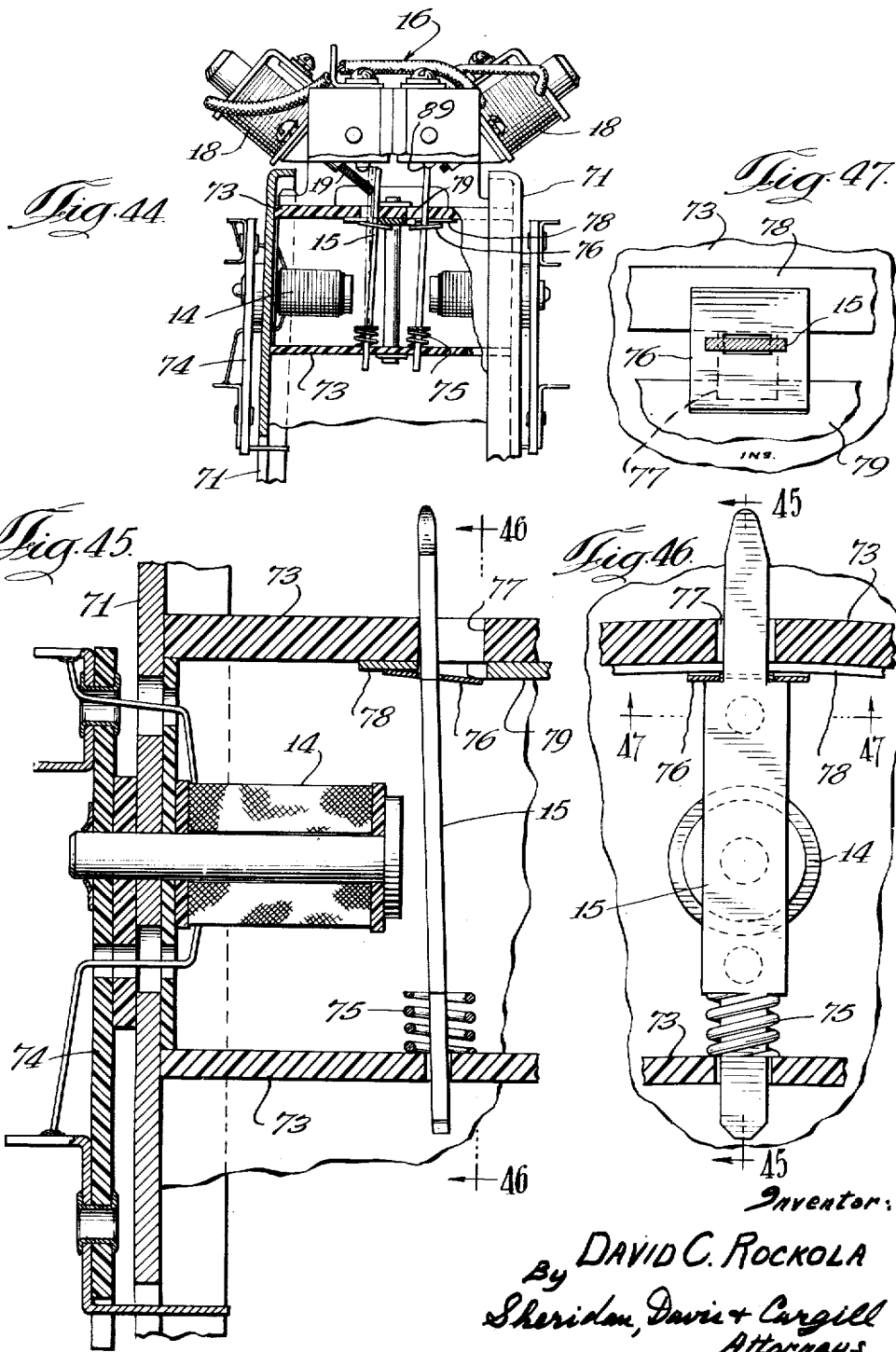
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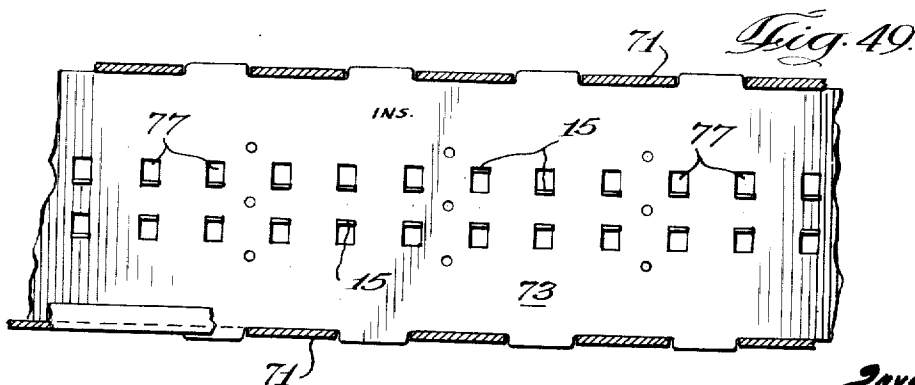
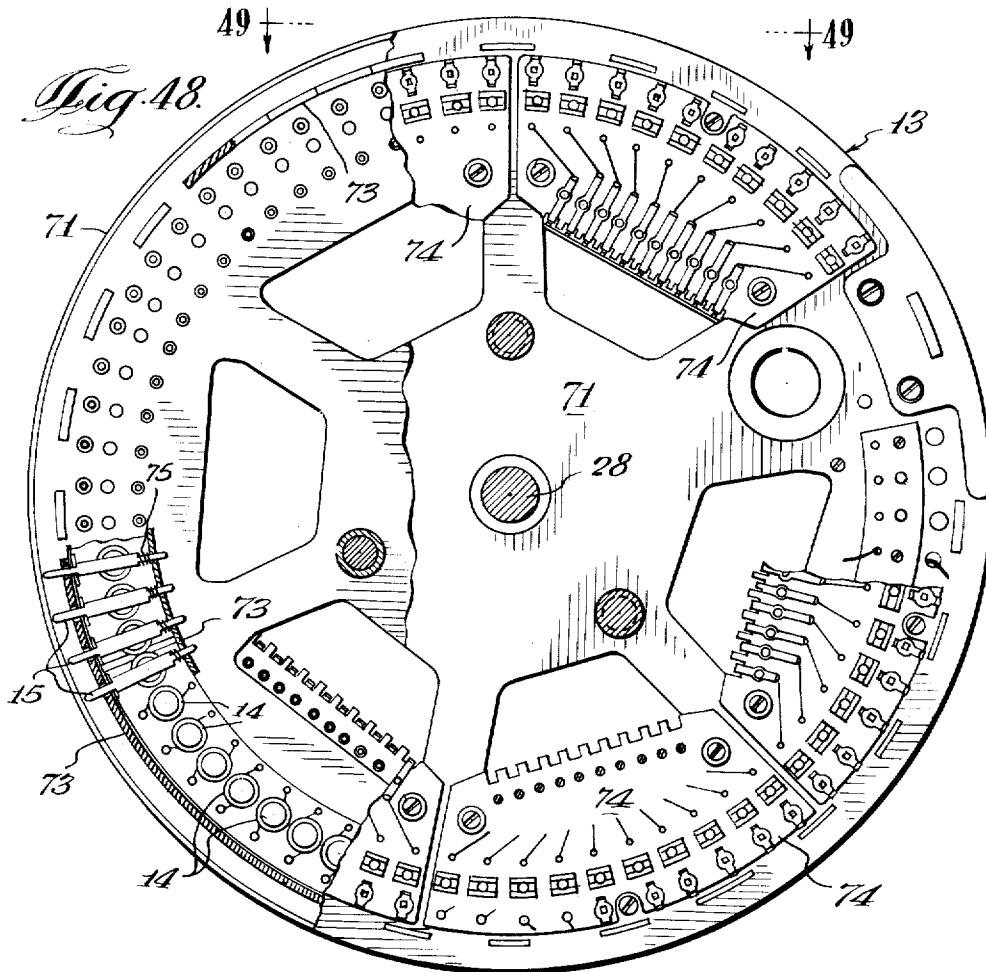
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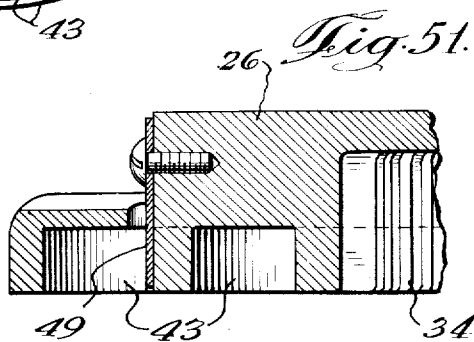
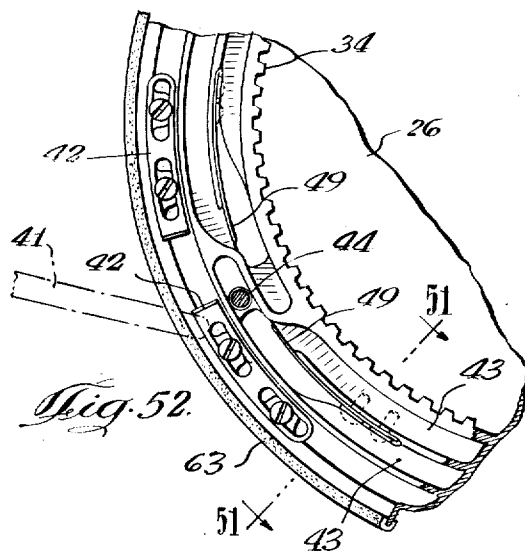
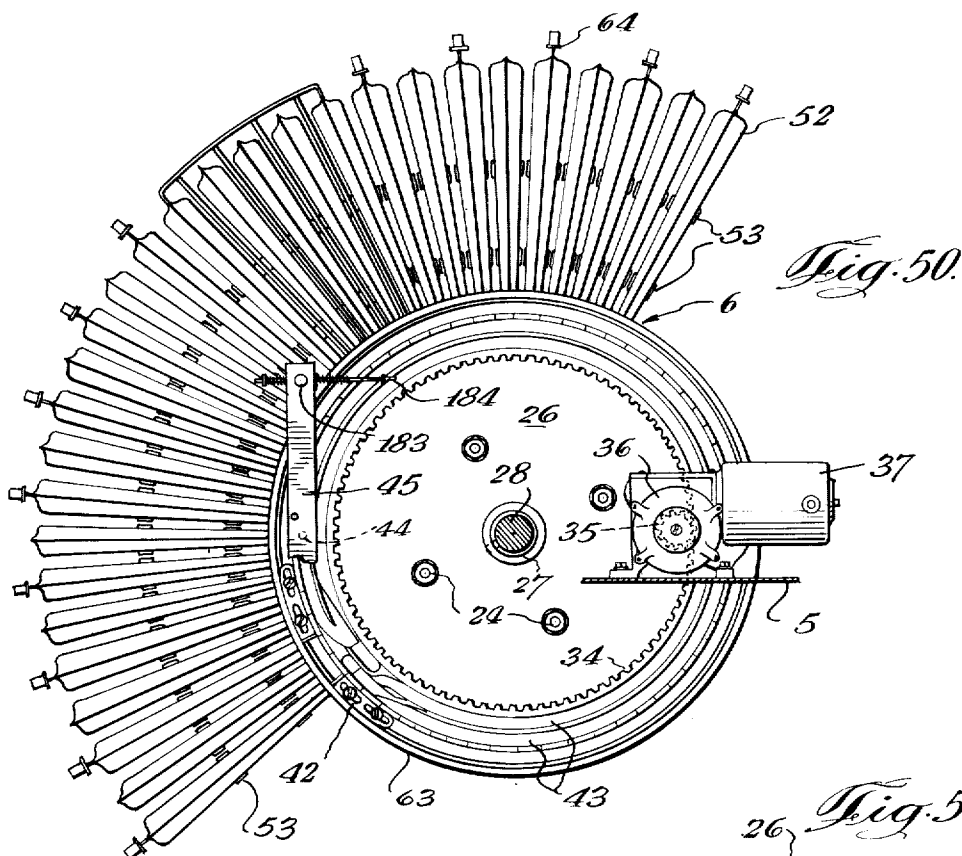
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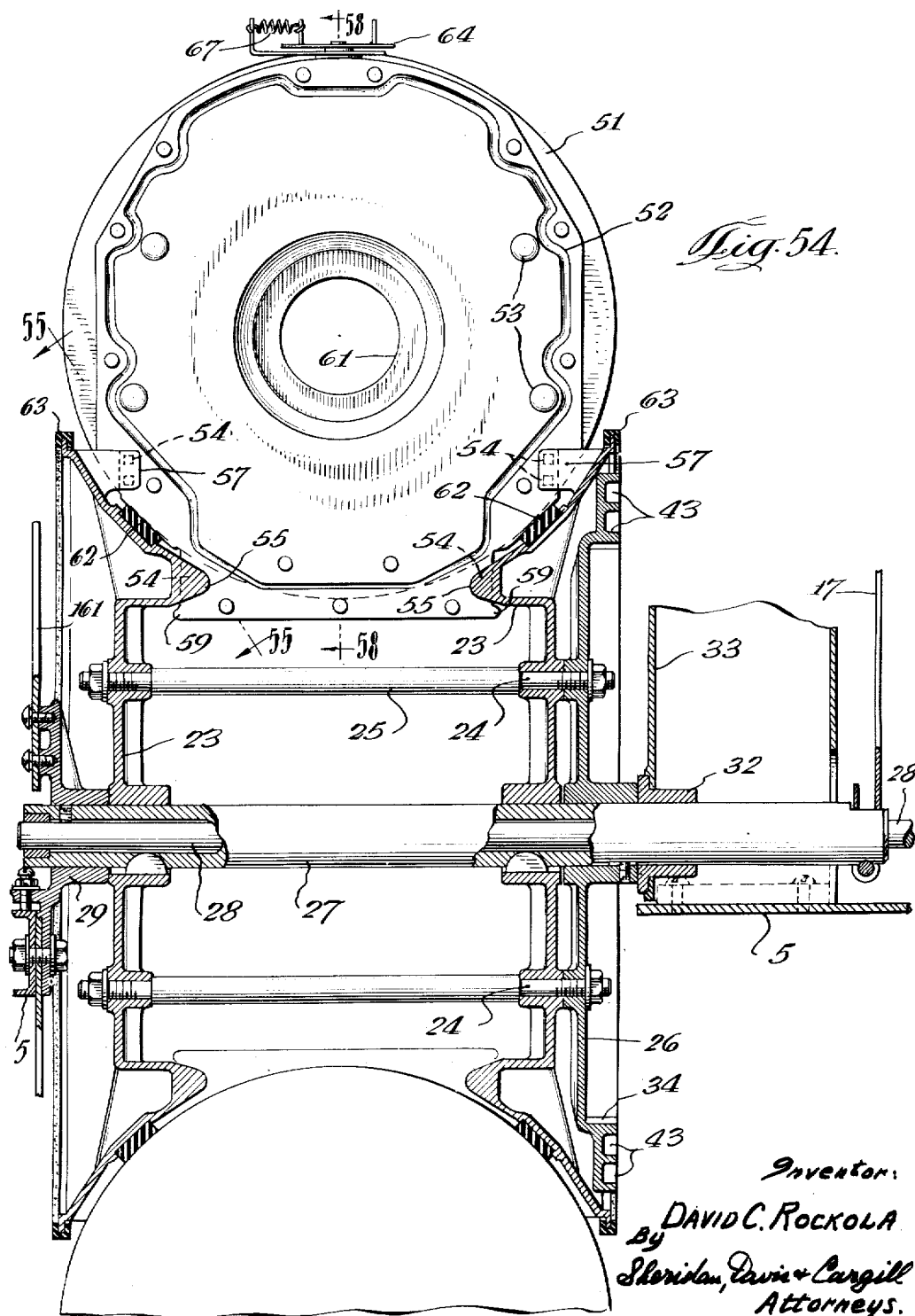
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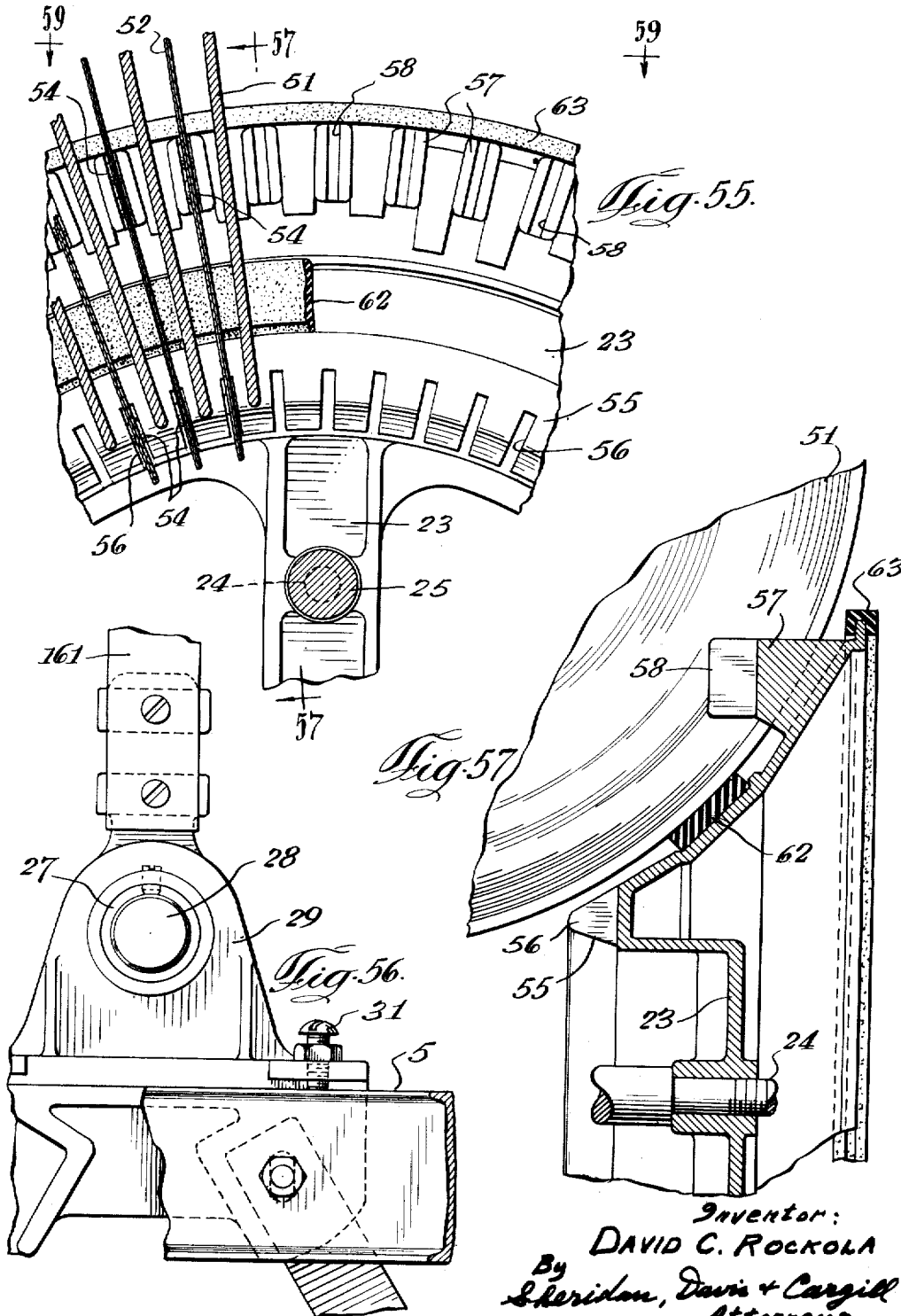
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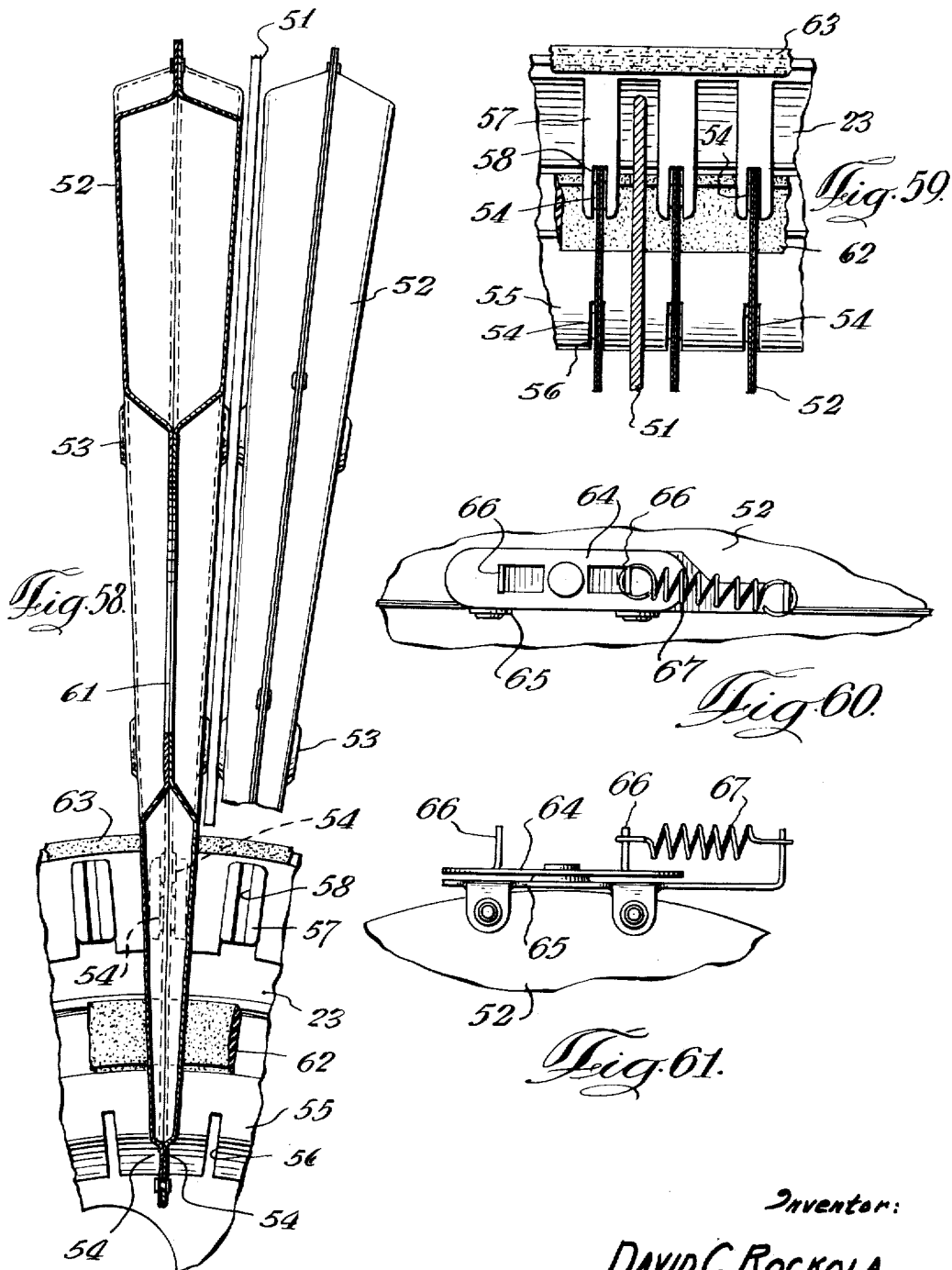
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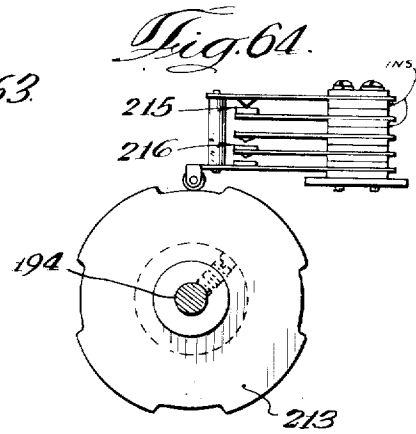
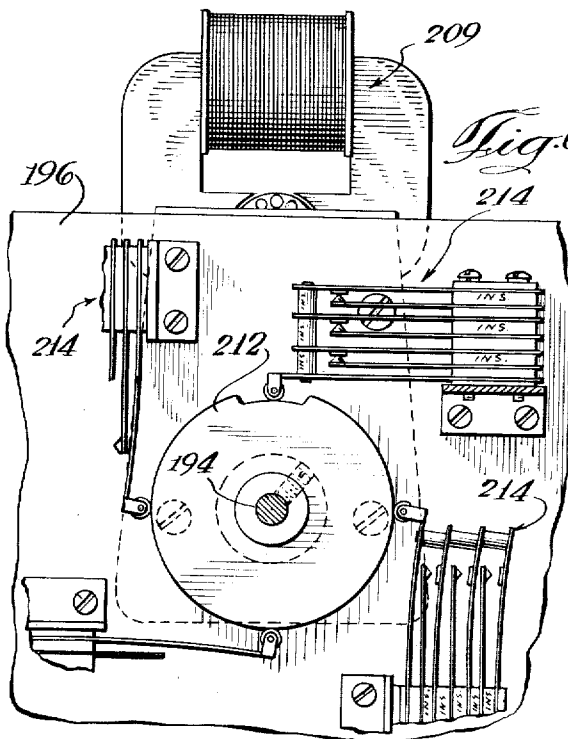
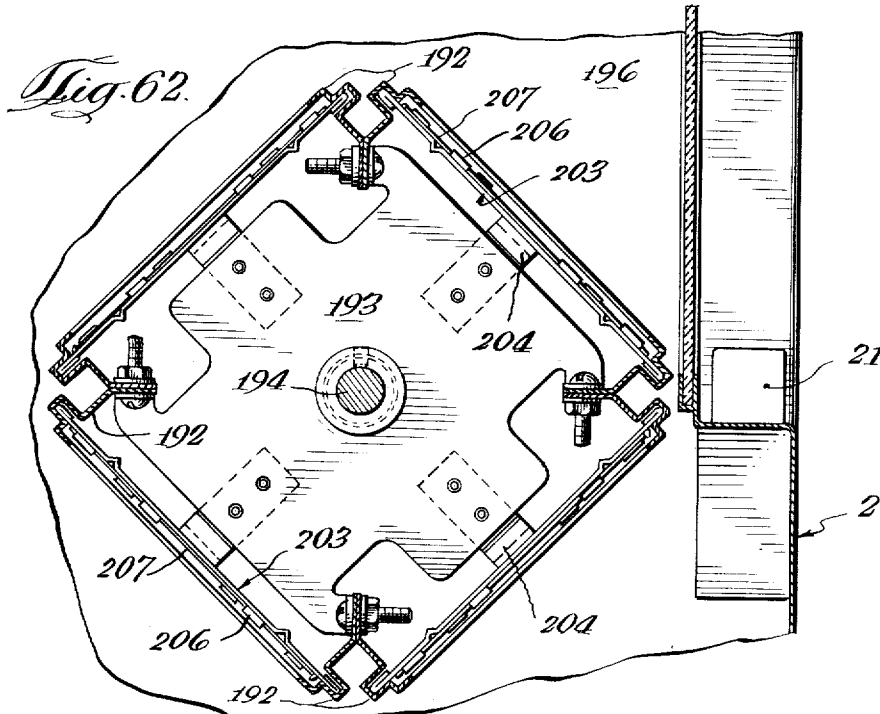
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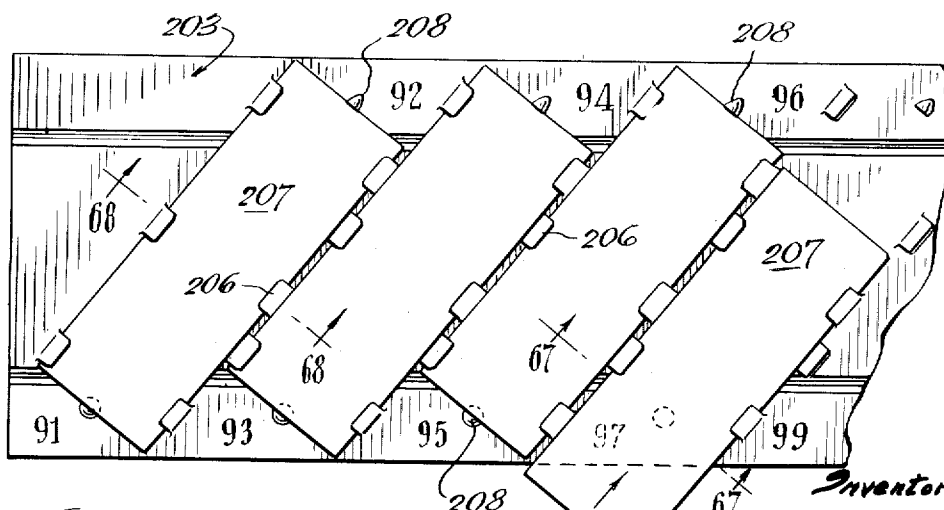
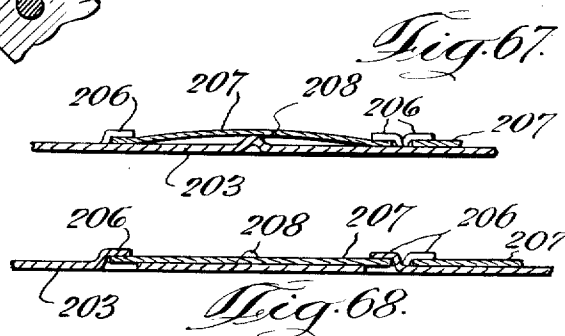
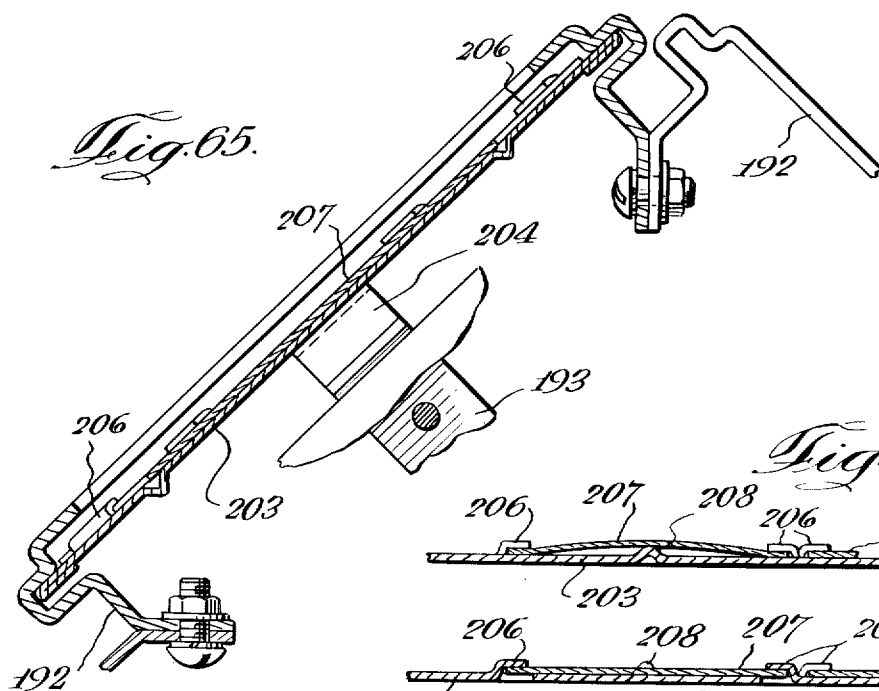
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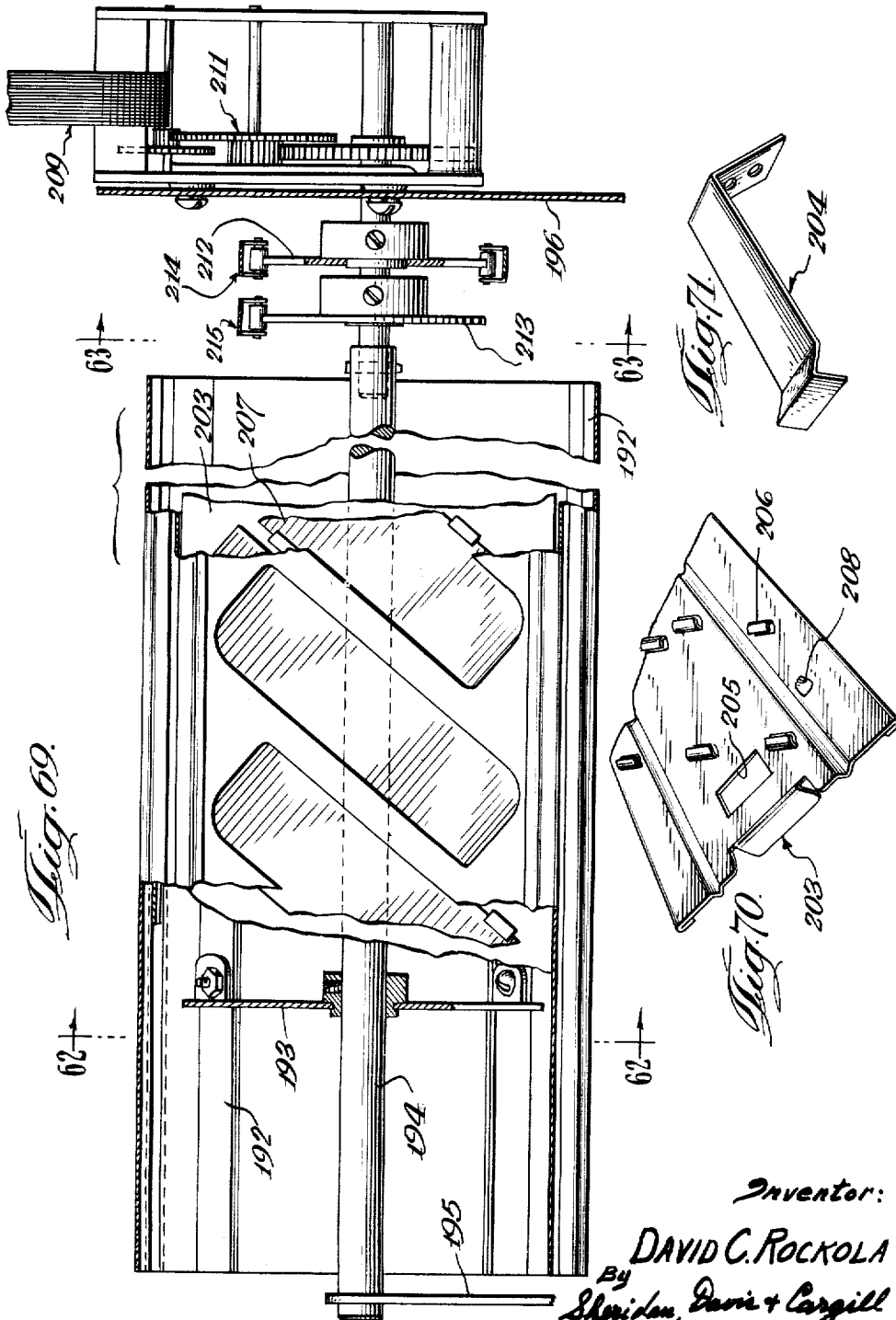
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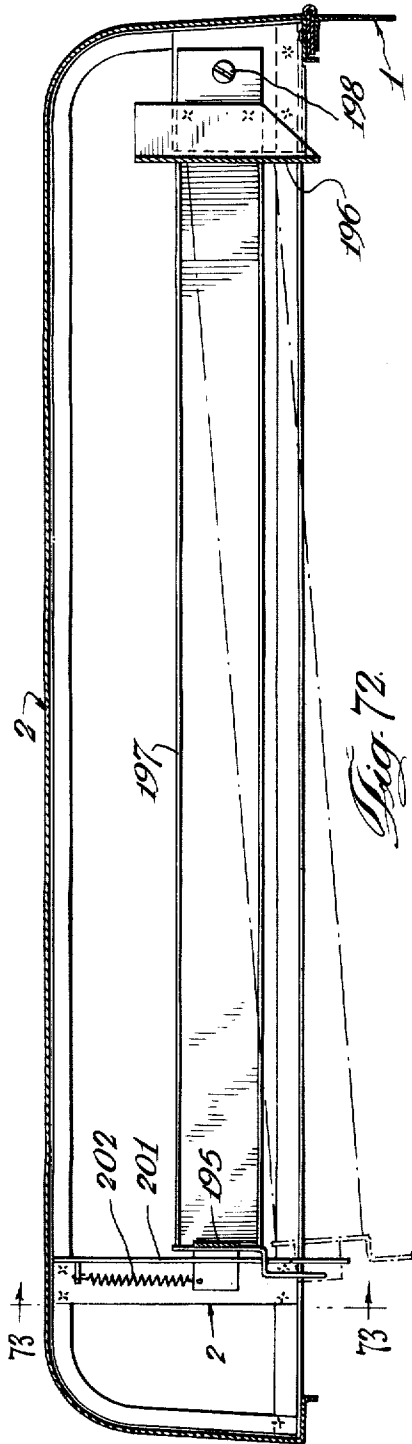


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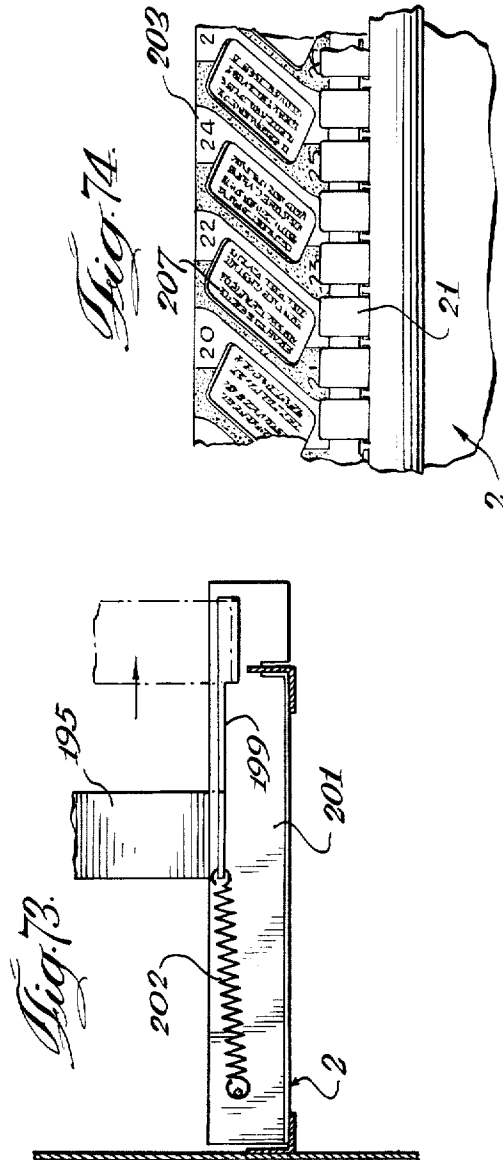


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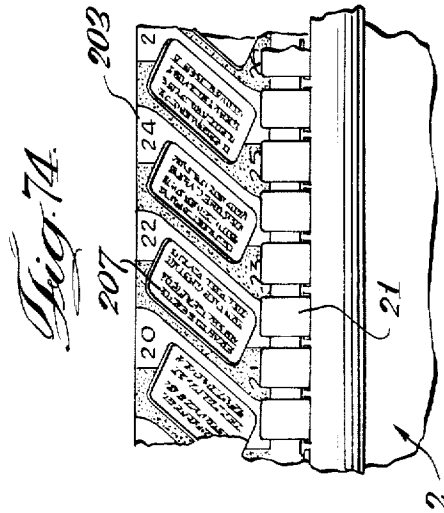


Fig. 74.

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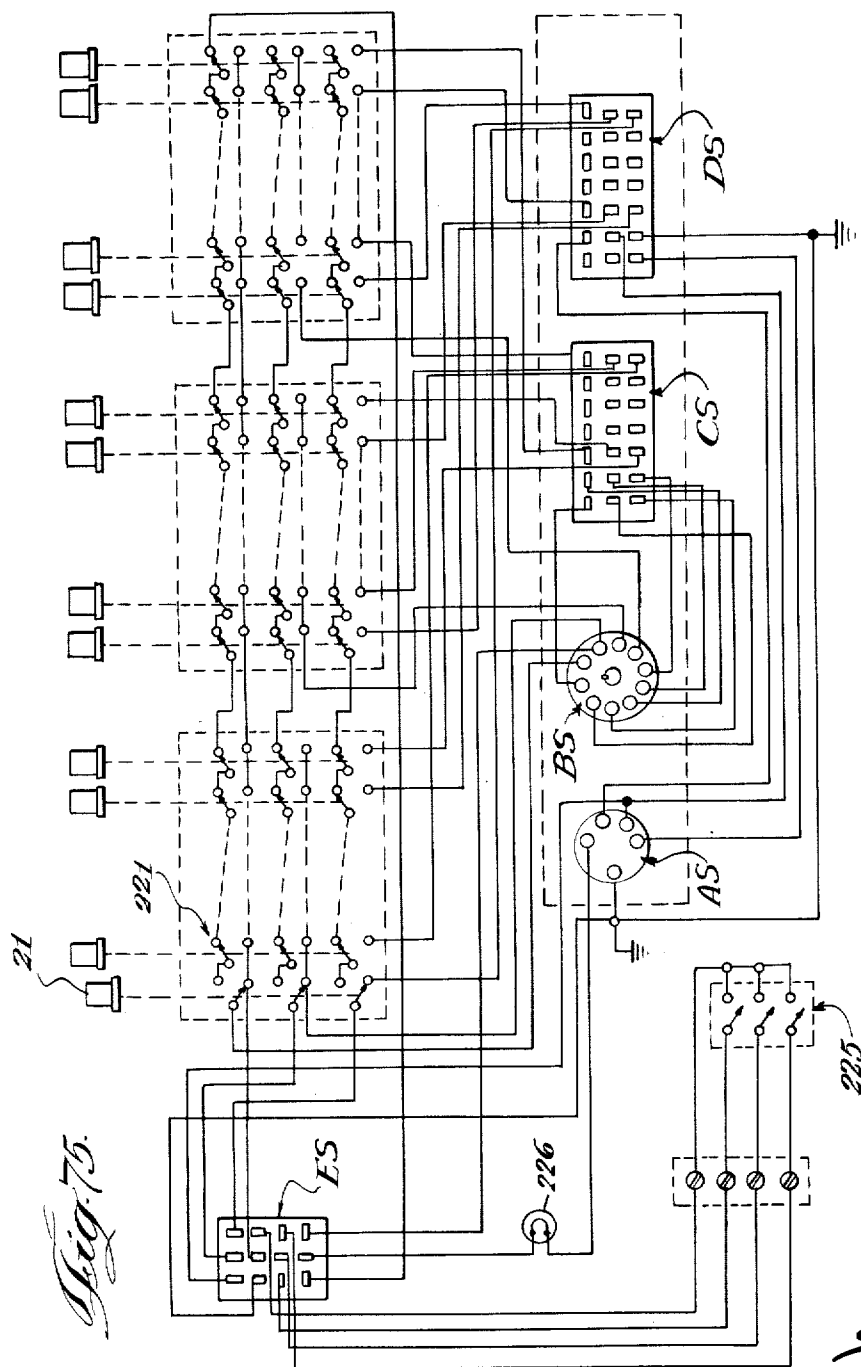


Fig. 75.

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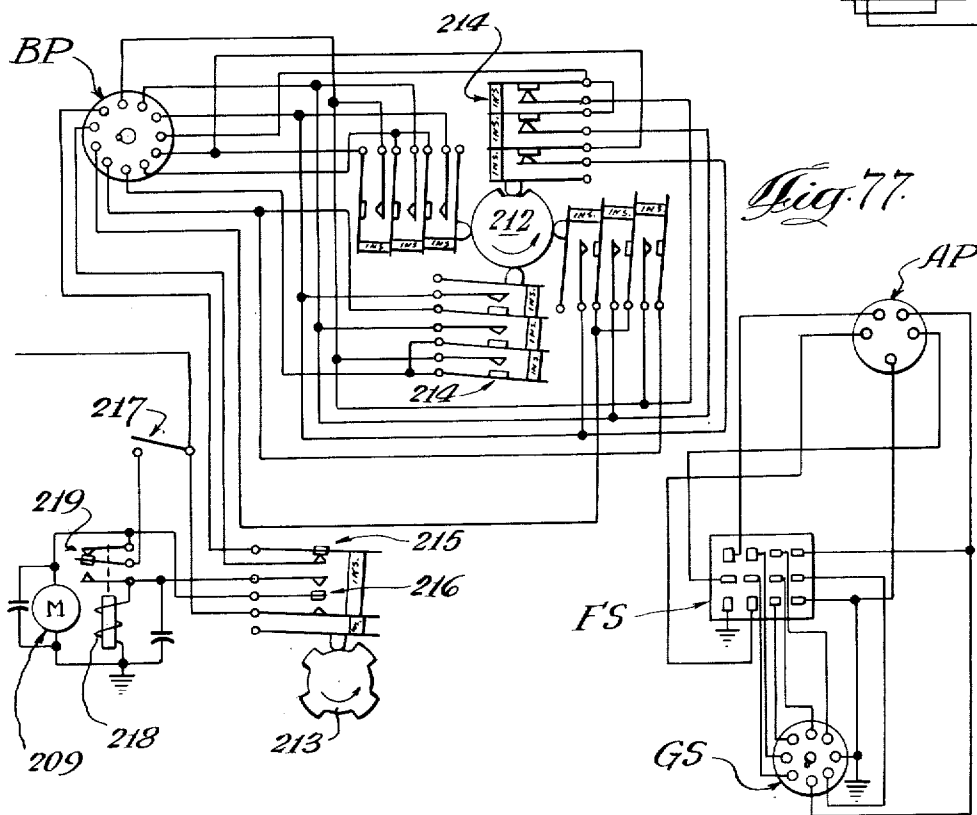
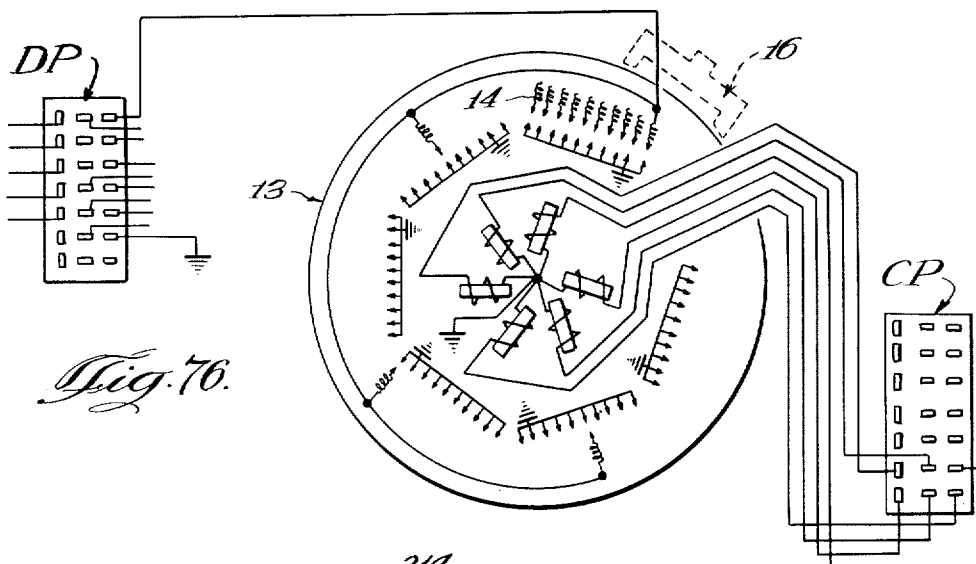
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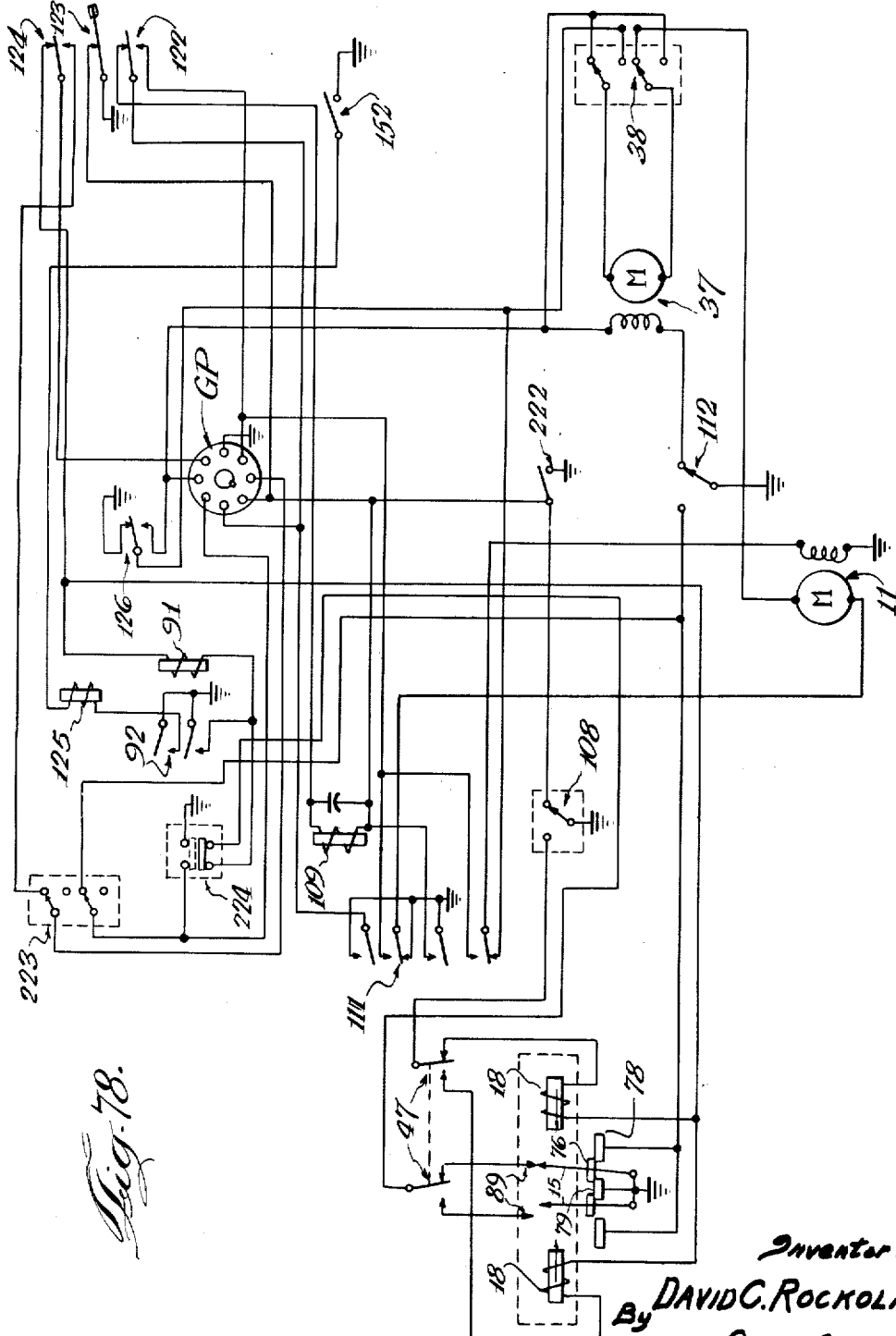


Fig. 78.

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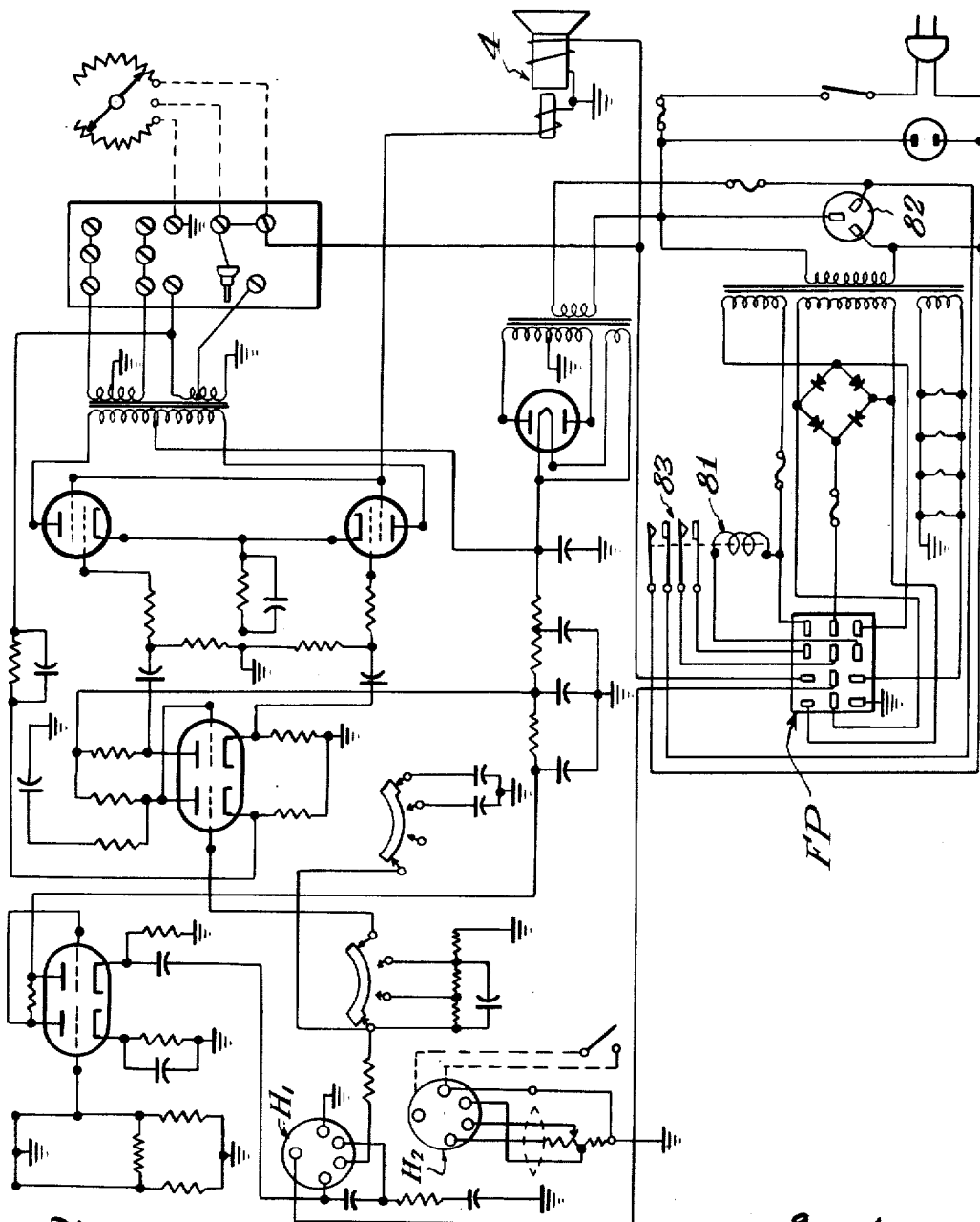


Fig. 79.

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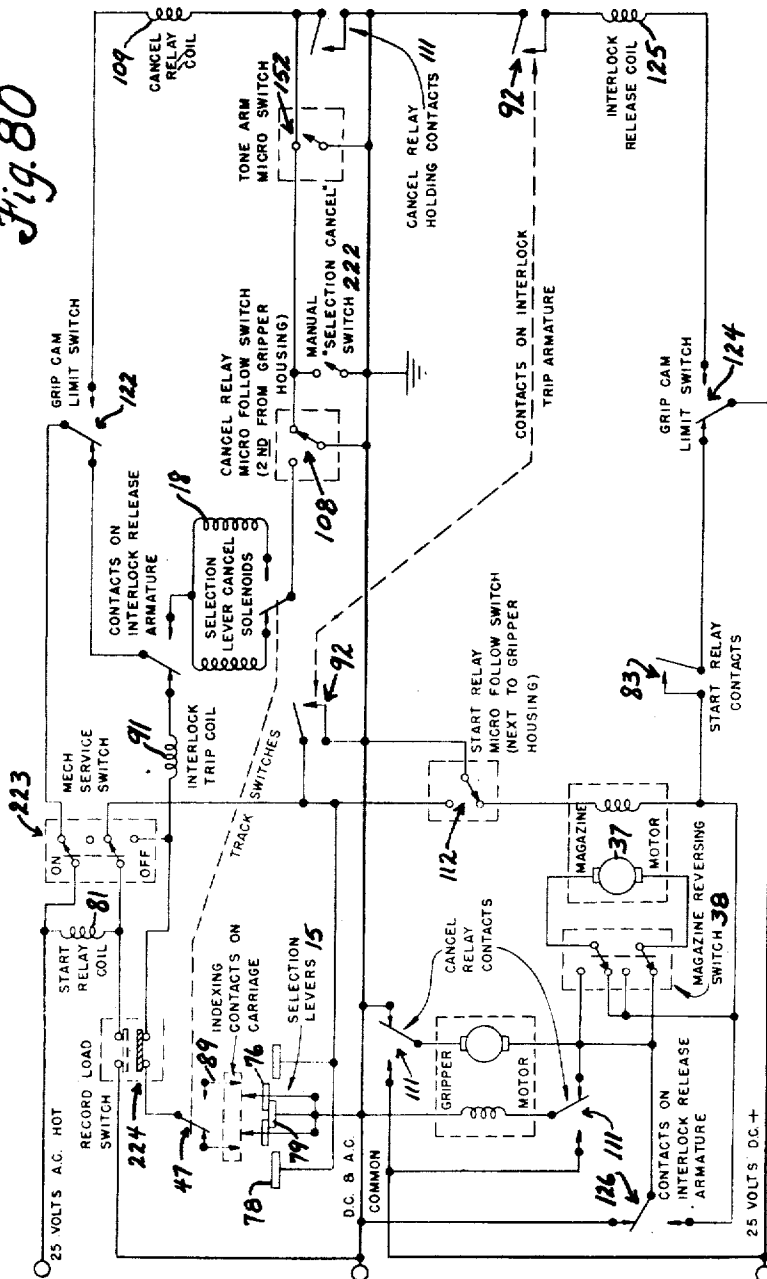
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Fig. 80



Sequence No. 1

Power On - No Selections Registered.

Grip arm over magazine.

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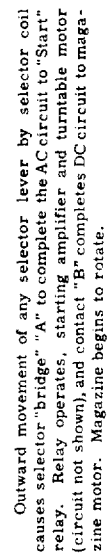
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and causes the magazine to rotate in the opposite direction. Simultaneously, the track switches are thrown to correspond to the magazine rotation. The switches are positioned to the left for clockwise rotation for ODD SELECTIONS and to the right for counterclockwise rotation and EVEN SELECTIONS.

Depending upon the previous stopped position and the particular selection now registered, it may be necessary for the magazine to reverse its direction of rotation. This occurs when the magazine "'trip brackets'" operate the reversing switch "C". This reverses the direction of the current through the magazine motor armature

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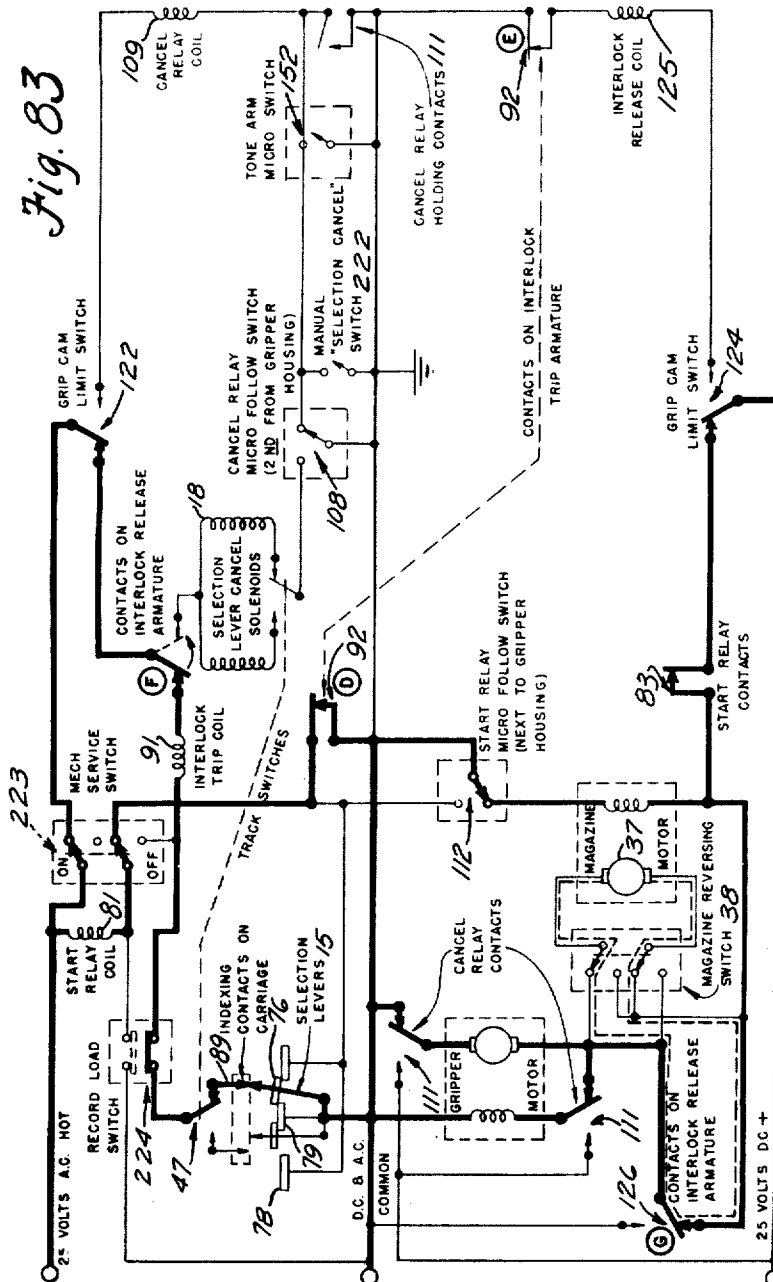
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armature releases, repositioning contacts "P" and "G". Contact "P" breaks the AC circuit to the interlock trip coil and makes connection to the "selection lever cancel solenoids". Contact "G" short circuits the magazine motor armature (dotted lines), dynamically braking the magazine and causing it to stop. It also completes the DC circuit to the grip motor through the relaxed cancel relay contacts causing it to engage the indexed record.

Sequence No. 4 RECORD INDEXED

The selector carriage, moving with the magazine, causes the indexing contact to strike the registered selection lever, thereby completing the AC circuit to the interlock trip coil. The interlock operates closing contacts "D" and "E". Contact "D" provides a holding circuit to the "Start" relay. "E" conditions a circuit for later use. As the trip armature completes its stroke, the release

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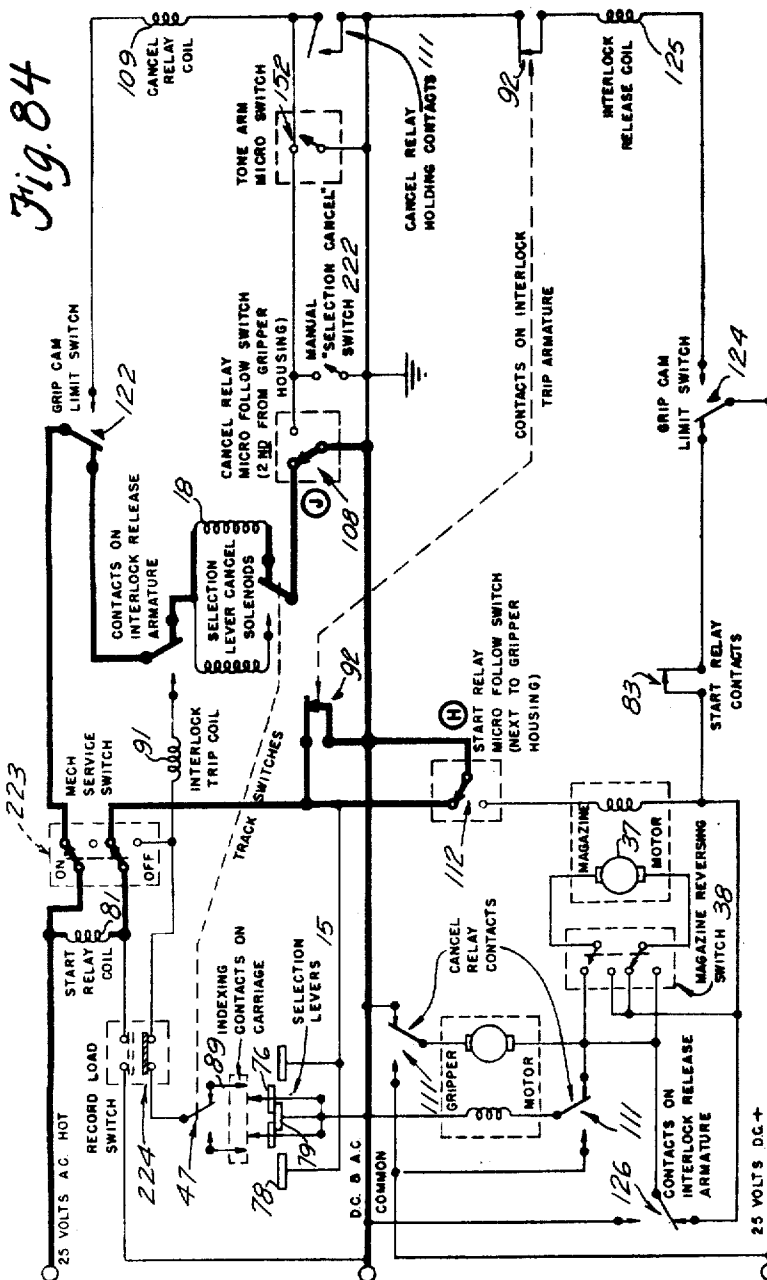
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micro follow switch "J" operates and completes the AC circuit to the proper selection lever cancel solenoid. This, in turn causes a spring plunger to push the registered selection lever to its normal position.

As the grip jaws engage the record, a cam operates the "start relay micro follow switch" "H", thereby disconnecting the magnetizing motor field coil and connecting an additional holding circuit to the "Start Relay". The grip motor continues to operate and places the record on the turntable. At this point, the camical relay

Sequence No. 5 SELECTOR LEVER RESET

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Aug. 27, 1957

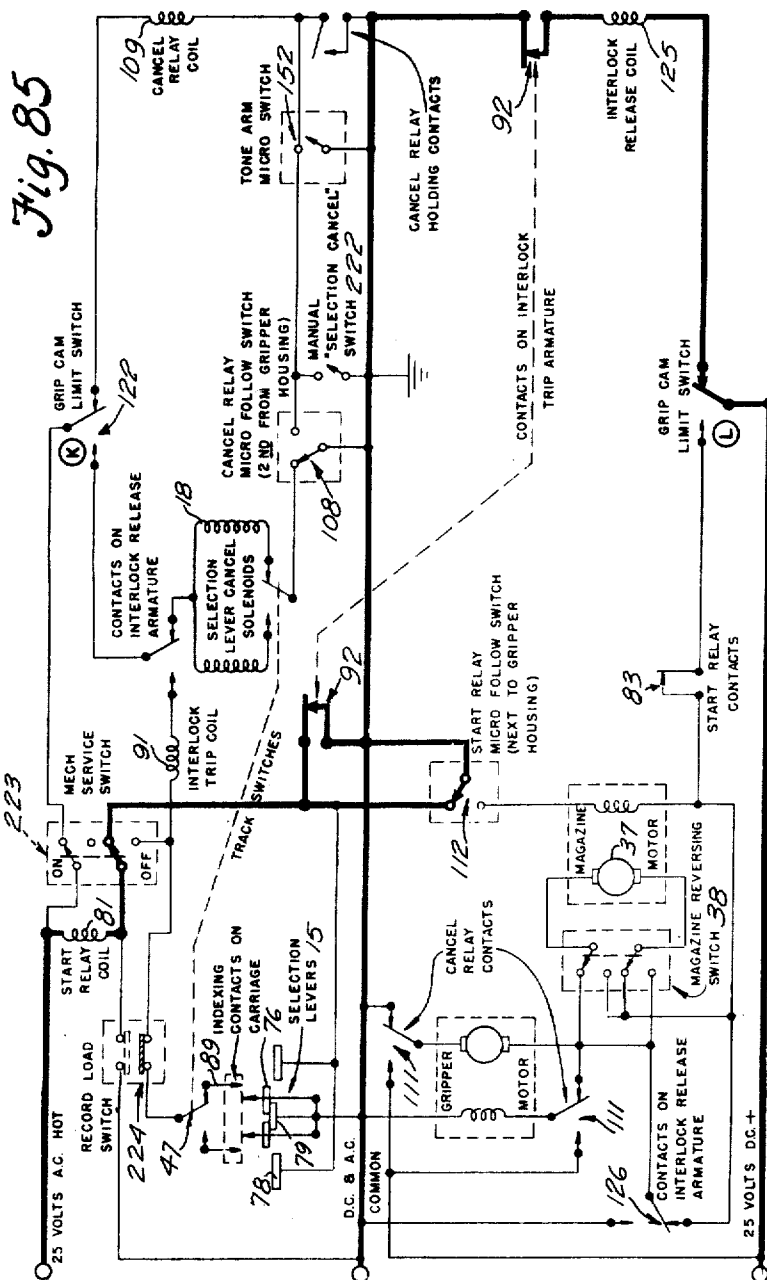
D. C. ROCKOLA

2,804,307

PHONOGRAPHS

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43 Sheets-Sheet 40



Section No. 6 RECORD TRANSFER CYCLE COMPLETED

Continued operation of the grip motor opens the grip jaws and places the tone arm into the record entry groove. At this point, a cam operates the "grip cam limit switch" "K" and "L". Switch section "K" breaks the selection lever cancel solenoid circuit, allowing the plunger to release, and conditions a circuit to the can-

cel relay for later use.

Switch "L" breaks the DC circuit supplying power to the grip motor and completes the circuit to the interlock release coil which operates the release armature.

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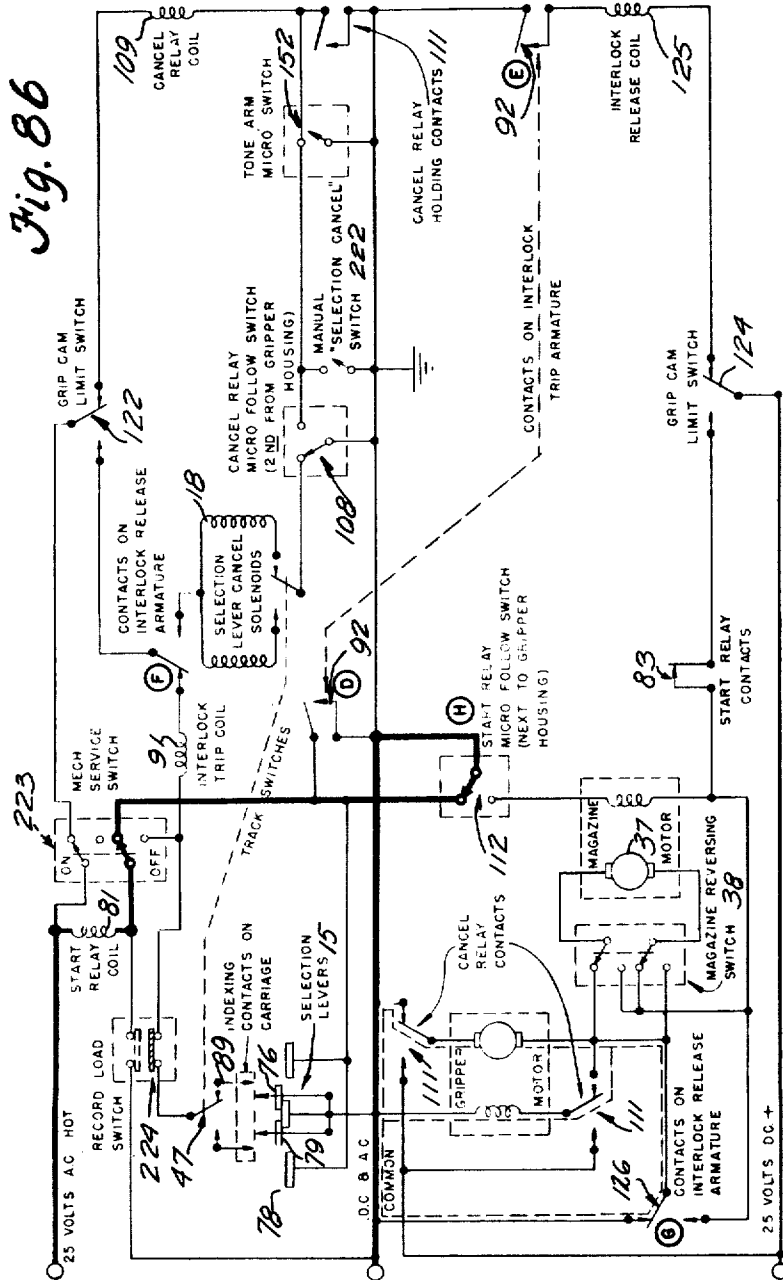
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2,804,307

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43 Sheets-Sheet 41



Sequence No. 7 GRIP MOTOR STOPS

The energized "release armature" places contacts "F" and "G" in their original positions. In so doing, contact "G" places a short circuit across the grip motor, dynamically breaking it and stopping the grip mechanism. As the release armature completes its stroke, the trip armature relaxes, thereby opening contacts

"D" and "E".

"D" removes its holding action from the start relay, which is now being held by micro switch contact "H". Contact "E" brakes the interlock release coil circuit. Music cycle now beings.

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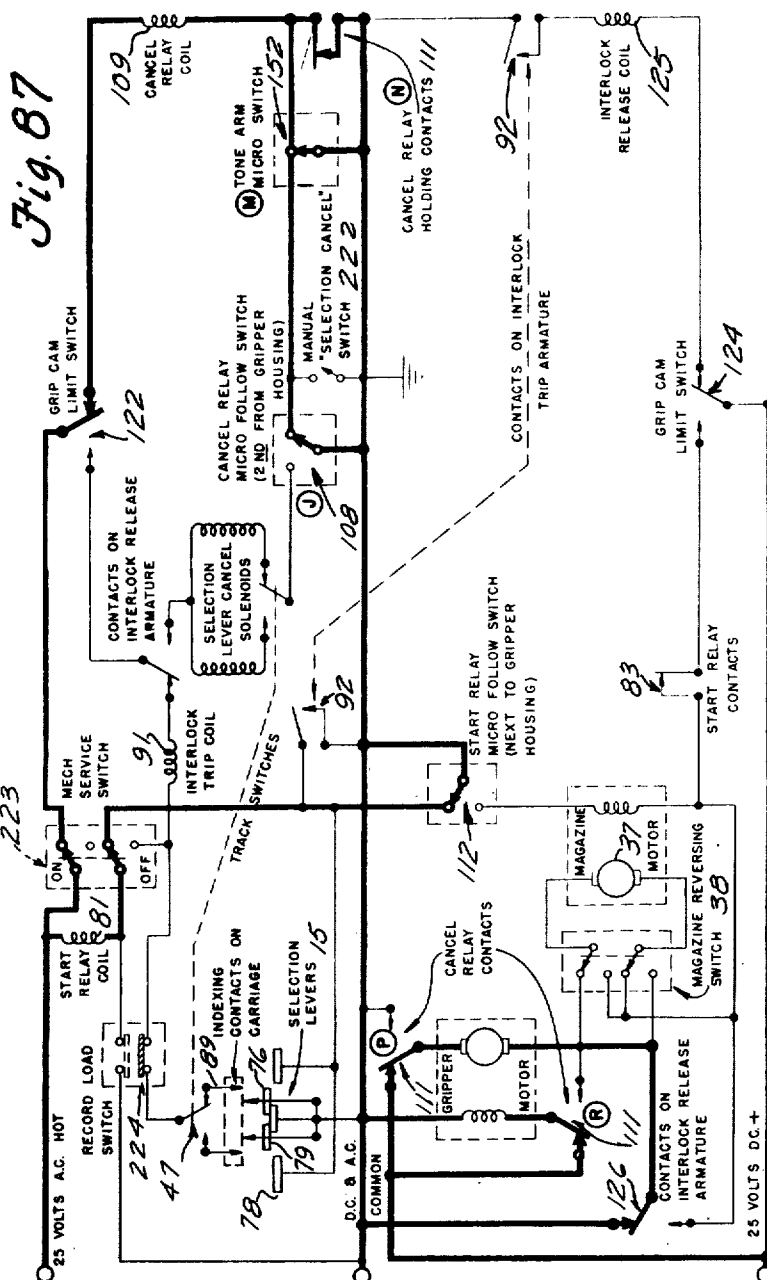
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Sequence No. 8 MUSIC CYCLE ENDED

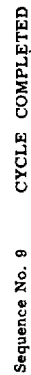
As record play is ended, the tone arm moves into the cut-off groove and operates the tone arm micro switch "M". This completes a circuit to the cancel relay, which operates, closing contact "N", and repositioning contacts "P" and "R". Contact "N" serves as a locking contact for the cancel relay in order to provide for momentary energizing. Contacts "P" and "R" complete the

grip motor circuit in such a manner that its direction of rotation is reversed and it closes the gripper jaws on the record. At this point micro switch "J" is again operated by the cam shaft and places a holding circuit to the cancel relay coil in parallel with the locking contact "N". The gripper then proceeds to return the record to the stack.

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2,804,307

43 Sheets-Sheet 43



As the gripper jaws begin to release the record in the magazine, the cam shaft again operates the start relay "micro follow switch" "H", thereby breaking the start relay coil circuit. This causes the start relay to relax, shutting off the turntable amplifier and opening start relay contact "B", provided no additional selections are registered.

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2,804,307

PHONOGRAPHS

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Application November 16, 1953, Serial No. 392,446

30 Claims. (Cl. 274—10)

This invention relates in general to phonographs, and more particularly to automatic, coin controlled, multi-record phonographs capable of storing a large number of disc records and selectively playing either or both sound recordings on the obverse and reverse sides of one, some, or all of them.

A principal object of the invention is to reduce the floor space requirements of such a phonograph to a minimum, while maintaining the highest possible sound fidelity and giving easier access to the operating mechanism for servicing and substitution of records. The manner in which this has been accomplished will more clearly appear from the following disclosure, and it will be seen that no appreciably greater space is required for the instant embodiment which affords 120 selections than for older mechanisms offering only 20 selections.

Another important object of the invention is the provision of novel record delivery mechanism for effecting positive transfer of a selected disc record between a storage magazine and a horizontal turntable, with either the obverse or reverse side of the record selectively facing upward when on the turntable.

Thus, another object of the invention is attained by providing such mechanism which requires the use of only a single tone arm having only one pickup, and in which the turntable always rotates in the same direction, both of which features facilitates high fidelity sound reproduction.

A further important object is the provision of novel phonograph mechanism which enables a large number of disc records to be stored edgewise and selectively played while, as previously noted, restricting the space requirements to a minimum. More specifically, these highly desirable results are attained by providing a rotary magazine drum or record holder mounted on a horizontal axis and a selector unit assembly mounted coaxially therewith.

With such novel arrangement, operation of the record delivery mechanism is facilitated, the delivery mechanism herein disclosed comprising a record gripper arm subtending the magazine drum to diametrically grip the indexed record, swing it upwardly and forwardly from the magazine, and turn it 90 degrees on its gripped diameter selectively in either direction to place either of its sides face up on the turntable, which is disposed forwardly of the magazine.

Another object of the invention is to provide simplified record delivery mechanism which also moves the tone arm from a normal inoperative position into playing position in engagement with the selected recording and returns the tone arm to inoperative position following the playing or music cycle.

A further object is the provision of a novel drum type of disc record magazine which is light in weight, simple of structure, lends itself to mass production methods, insures against warping or other damage to the records, and safely retains each record in proper position therein.

Another object is to provide a compact and accurate

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selector unit assembly comprising a stationary drum or coil bank having two rows of radially disposed selection levers, and a carriage rotatable around that drum and carrying indexing contacts cooperating with such levers when the latter are in operative position to effect proper indexing of the magazine and initiation of operation of the delivery mechanism.

A further object is to insure accurate indexing by mounting such selector carriage for movement by the record magazines.

Another object of the invention is the provision of a simplified co-axial popularity meter readable at a glance to determine the number of times each recording has been played, together with accurate and inexpensive means for actuating and zeroizing the same.

A further object of the invention is to enable "file tray" programming for easier selecting and faster servicing by providing a novel selectively operable program holder which visually cooperates with manually operable selector buttons or keys and includes a separate tray for each desired selection grouping or classification which is quickly removable by the service man to change desired selection identifying indices carried thereby.

Another object is to insure accurate and dependable machine operation, which is accomplished by providing novel controls and interlocks, both mechanical and electrical.

Numerous other objects and advantages of the invention will be apparent as it is better understood from the following description, which, when taken in connection with the accompanying drawings, discloses a preferred embodiment thereof.

In the drawings:

Figure 1 is a perspective view of an automatic phonograph embodying the features of the instant invention, showing the front door swung to an open position;

Fig. 2 is a front plan view of the operating mechanism of the machine of Fig. 1;

Fig. 3 is a left side view;

Fig. 4 is a right side view;

Fig. 5 is a rear view;

Fig. 6 is an enlarged front elevation of the sound reproducing mechanism;

Fig. 7 is a vertical section on the line 7—7 of Fig. 3;

Fig. 8 is an enlarged detail view of the tone arm mechanism, with parts in section, as seen from the right side of the machine;

Fig. 9 is a vertical section on line 9—9 of Fig. 8;

Fig. 10 is a detail vertical section through the tone arm post;

Fig. 11 is a plan view of the tone arm with parts thereof in section;

Fig. 12 is a detail plan view illustrating the lateral travel of the tone arm;

Fig. 13 is a detail vertical section on line 13—13 of Fig. 11;

Fig. 14 is a detail horizontal section on line 14—14 of Fig. 8;

Fig. 15 is an enlarged vertical section on line 15—15 of Fig. 7;

Fig. 16 is a view similar to Fig. 15 showing the gripper arm returning a record to the magazine;

Fig. 17 is a detail vertical section on line 17—17 of Fig. 15;

Fig. 18 is a view similar to Figs. 15 and 16 as the record is being replaced in the magazine;

Fig. 19 is an enlarged vertical section on line 19—19 of Fig. 2;

Fig. 20 is a detail front elevation as seen from line 20—20 of Fig. 19;

Fig. 21 is a detail perspective of the lock mechanism;

Fig. 22 is an enlarged front elevation of the gripper cam drive system, with parts broken away;

Fig. 23 is a horizontal section on line 23—23 of Fig. 22 showing the flip-over shift cam;

Fig. 24 is a diagrammatic view of the reversing switch operation;

Fig. 25 is a detail vertical section on line 25—25 of Fig. 7 showing the gripper end flip cams as a record is placed on the turntable;

Fig. 26 is a view similar to Fig. 25 as the record gripper jaws are released;

Figs. 27 and 28 are perspective views of the outer and inner grip cams;

Fig. 29 is a horizontal detail section on line 29—29 of Fig. 31 showing the gripper jaw mechanism;

Fig. 30 is a perspective view of the record release cam;

Fig. 31 is a vertical section on line 31—31 of Fig. 29;

Fig. 32 is a view similar to Figs. 25 and 26 as seen from the other side of the machine;

Fig. 33 is a view similar to Fig. 31 showing the record release;

Fig. 34 is a detail vertical section of the flip-over mechanism as a record is being moved from the turntable;

Fig. 35 is a perspective view of the gripper spider;

Fig. 36 is a detail rear elevation on line 36—36 of Fig. 34;

Fig. 37 is a view similar to Fig. 34 with the gripper arm in an intermediate position;

Fig. 38 is a detail elevation from the right side of the machine showing a portion of the counter and popularity meter drive mechanism;

Fig. 39 is a view of the gear train of Fig. 38 as seen from the left side thereof;

Fig. 40 is a detail elevation of the delivery mechanism from the left side of the machine;

Fig. 41 is a detail plan view of the selector carriage;

Fig. 42 is a detail section on line 42—42 of Fig. 43;

Figs. 43 and 44 are vertical sections on lines 43—43 and 44—44, respectively, of Fig. 41;

Fig. 45 is a magnified vertical section through a portion of the selector drum on the line 45—45 of Fig. 46;

Fig. 46 is a similar section transversely of the machine on the line 46—46 of Fig. 45;

Fig. 47 is a detail section on line 47—47 of Fig. 46;

Fig. 48 is a front elevation, with parts broken away, of the selector drum;

Fig. 49 is an enlarged plan of the drum of Fig. 48;

Fig. 50 is a detail front elevation of a portion of the record magazine;

Fig. 51 is an enlarged detailed section through the magazine ring gear castings on line 51—51 of Fig. 52;

Fig. 52 is an enlarged elevation of a portion of the mechanism of Fig. 50;

Fig. 53 is a perspective of a cam groove switch-over leaf spring;

Fig. 54 is an enlarged vertical section on line 54—54 of Fig. 2;

Fig. 55 is a detail section on line 55—55 of Fig. 54;

Fig. 56 is an enlarged rear elevation of the magazine drum mounting;

Fig. 57 is a detail section on line 57—57 of Fig. 55;

Fig. 58 is a detail vertical section on line 58—58 of Fig. 54;

Fig. 59 is a detail section on line 59—59 of Fig. 55;

Fig. 60 is an enlarged plan view of a record lock-in swivel plate;

Fig. 61 is a side elevation as seen from the bottom of Fig. 60;

Figs. 62 and 63 are enlarged vertical sections through the program holder on lines 62—62 and 63—63 of Fig. 69;

Fig. 64 is a detail elevation of the start relay follow switch;

Fig. 65 is an enlarged fragmentary section on line 62—62 of Fig. 69;

Fig. 66 is a plan of a portion of one of the program holder slides;

Figs. 67 and 68 are detail sections on lines 67—67 and 68—68 of Fig. 66;

Fig. 69 is an enlarged rear elevation of the program holder with parts broken away;

Fig. 70 is a perspective view of an end portion of a program holder slide;

Fig. 71 is a perspective of a slide retaining latch;

Fig. 72 is a horizontal section through the front door of the machine below the program holder;

Fig. 73 is a detail vertical section on line 73—73 of Fig. 72;

Fig. 74 is a detail front elevation of a portion of the selector button assembly on the door of the machine;

Figs. 75 through 79 are wiring diagrams of the control circuits of the machine; and

Figs. 80 through 88 are descriptive sequence diagrams describing the complete machine operation.

Referring more particularly to Figure 1, an automatic phonograph embodying the instant invention is therein generally disclosed as incorporated within a suitable casing 1 having a front door 2, a rear door (not shown), and a rearwardly swingable dome-type cover 3 to give ready access to the operating mechanism. Within the lower portion of the casing 1 is mounted the amplifier system for the phonograph, including a speaker 4. The operating mechanism is disposed above the latter and supported by a frame 5 mounted in any suitable manner within the casing. The operating mechanism includes a drum-type record magazine 6, a turntable 7, a tone arm 8 (Figs. 2 and 4), and record delivery mechanism for transferring records between the magazine 6 and turntable 7 which comprises a gripper arm 9 driven by a gripper motor 11 (Fig. 7) through a cam shaft 12 which also positions tone arm 8. Referring back to Figs. 1 and 2, co-axially mounted with the magazine drum 6 is a selector unit assembly comprising a stationary coil bank or drum 13 housing a plurality of selector coils 14 and selector levers 15 (Fig. 45). This selector unit assembly also includes a selector carriage 16 (Figs. 2 and 4) which is mounted on a selector arm 17 (Fig. 7) for rotation around the periphery of selector drum 13 by the magazine 6. The selector carriage 16 includes a pair of selector lever cancel solenoids 18 (Fig. 43) for operating spring plungers 19.

Initiation of operation of this mechanism may be effected at the machine or at a remotely located control unit by deposit of a coin and operation of a selector button, such as the buttons 21 (Figs. 74 and 75) which are mounted on the exterior of the front door 2 forwardly of a program holder 22 (Fig. 1). A remote control unit which may be employed with the instant machine is that disclosed in my co-pending application Serial No. 392,265, filed November 16, 1953. Deposit of a proper coin or coins operates a suitable accumulator, such as that disclosed in U. S. Letters Patent No. 2,613,791, issued October 14, 1952, and application Serial No. 196,663, filed November 20, 1950, and conditions the selectively operable manual push buttons 21 for effective actuation. Such actuation of an operative selector button 21 momentarily energizes the selector coil 14 and a credit is removed from the accumulator. The momentarily energized coil 14 moves its associated selection lever 15 to an outer or play position which closes a circuit to a start relay in the amplifier, thereby turning on the latter, and suitable turntable and magazine motors. The latter revolves the magazine 6 and selector arm 17 clockwise or counter-clockwise, depending upon the position of a magazine reversing switch, the selector arm 17 rotating the carriage 16 over the several selection levers 15 which radiate out of the coil bank drum 13. In the instant modification there are 120 levers 15, one for each record side,

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arranged radially of their supporting drum in two parallel rows of 60 levers each. The levers for playing the even numbered selections are in a row toward the rear of the machine and the selection sequence is such that even numbers are selected from 2 to 120 and odd numbers from 119 to 1.

Rotation of the magazine 6 continues until a contact in the bottom of the carriage assembly strikes the selected lever 15 which has been moved into its path. This closes a circuit to an interlock relay trip coil to reposition its associated contacts. This short-circuits the magazine motor armature and dynamically brakes the motor causing the magazine to stop. In addition, a circuit is closed to the gripper motor 11 which revolves cam shaft 12 and causes the jaws of the gripper arm 9 to grasp the selected record. At the same time a micro switch is operated by the cam shaft to disconnect the field coil of the magazine motor and parallel the selector lever circuit to the start relay.

As the gripper motor 11 continues to operate, the grip arm 9 removes the record from the magazine 6 and places it on the turntable 7. A mechanical action is involved in this movement which determines the proper turning or positioning of the record for either odd or even selections. As the record is placed on the turntable, an outer micro switch lever closes a circuit to the proper selector lever cancel solenoid 18 on the carriage 16 to cause its plunger 19 to strike and reset the selected lever 15. This solenoid continues to be energized until the gripper mechanism snaps a group of ganged switches called the grip cam limit switches, the resulting change of position of which opens the circuit to the energized solenoid 18 to release its spring plunger 19. In addition, such actuation of these switches interrupts the circuit to grip motor 11 and a circuit to an interlock relay release coil is completed. The latter releases the interlock relay to its original position and places a short-circuit across the grip motor armature which causes it to stop.

During the above actions, a tone arm cam operated by the gripper motor 11 has placed the tone arm on the record, and the machine has reached the playing or music cycle. When the tone arm reaches the record cut-off groove, a micro switch closes the circuit to a cancel relay coil, the contacts of which close the grip motor circuit in such manner that its direction of rotation is reversed, whereby the jaws of gripper arm 9 engage the record and return the same from the turntable 7 to its proper position in the magazine 6. As the grip jaws begin to release the record the inner micro switch is again operated to break the circuit to the stop relay and cause it to relax providing no additional selections are registered in the accumulator. This breaks the circuits to the turntable motor and amplifier, causing them to become inoperative. After the grip jaws have released the record, the grip cam limit switch snaps to its original position and opens the cancel relay circuit. In turn, this opens the circuit to the gripper motor 11 and shorts its armature, causing the motor to stop. The machine cycle thereby is completed with all of the parts being returned to normal condition.

The various parts will now be described in detail, starting with the record magazine 6, which is fully illustrated in Figs. 2-5, 7 and 50-61. As therein disclosed, it will be seen that a hub portion of the magazine drum comprises similar lightweight front and rear castings 23 (Fig. 54) secured together in spaced relationship by tie rods 24 and spacer sleeves 25, the tie rods 24 also securing a cam track and ring gear casting 26 to the outer wall of the front casting 23. These hub members 23, 26 are mounted upon a sleeve 27 and secured thereto by keys and a suitable set screw, and the sleeve 27 is mounted upon and secured to a horizontal shaft 28. At their rear ends, the sleeve 27 and shaft 28 are rotatably supported in a trunnion or bearing bracket 29 which is mounted upon the frame 5 and may be adjusted vertically relative thereto by suitable bolts 31, as best seen in Fig. 56. Intermediate their ends

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and forward of casting 26, the sleeve 27 and shaft 28 are similarly supported and extend through a journal 32 (Fig. 54) mounted in an upright frame casting 33 (Fig. 7), in turn supported by and secured to the machine frame 5.

The casting 26 is formed to provide a ring gear 34 meshing with a drive pinion 35 (Figs. 5 and 50) which is driven through a gear box 36 by a reversible magazine motor 37 mounted on the frame 5 (Fig. 4). The direction of rotation of motor 37 is determined by a magazine reversing switch 38 (Fig. 3) mounted on the rear leg of a frame bracket 39. Switch 38 has a two-position switch arm 41 (Figs. 3 and 52) which extends into the path of two adjustable trip brackets 42 extending forwardly from the magazine casting 26 (Figs. 50 and 52). At the end of its cycle when moving counterclockwise (as viewed from the front of the machine), the record magazine 6 thus moves switch arm 41 to its lower position, as is being effected in Fig. 52 where the arm 41 is shown in broken lines, by the then leading trip bracket 42, while the other bracket 42 moves arm 41 to its upper position of Fig. 3 at the end of the magazine rotating cycle when moving clockwise. The polarity of the armature of motor 37 is thus reversed automatically.

Outwardly of ring gear 34, the magazine casting 26 is provided with two concentric cam tracks 43 (Figs. 7 and 50-52) within which is disposed a track roller 44 (Figs. 7 and 52) carried by and extending rearwardly from an arm 45 (Fig. 7), which is pivoted at its lower end and has a stud 46 extending forwardly for actuating a double track switch 47 adjustably mounted by a bracket 48 on the auxiliary frame 39. Switch points between the two cam tracks 43 (Figs. 50 and 52) are provided adjacent the trip brackets 42 which comprise extensions of one cam track or groove into the other, and into which extend the free ends of leaf springs 49 (Figs. 51-53) secured at their other ends to the magazine casting 26. As the magazine is rotating counterclockwise, roller 44 is in the inner cam track 43. As it reaches the end of its cycle, roller 44 passes spring 49 into the outer track 43 to its position of Fig. 52, wherein the record magazine is just reversing to clockwise rotation, and during the latter roller 44 rides in the outer cam track. Arm 45 and stud 46 thus are swung laterally between two positions, the one shown in Fig. 7 when roller 44 is in the inner track to hold both right-hand circuits of track switches 47 closed, and the other in which the switches assume a position with their left-hand circuits closed when roller 44 is in the outer cam track 43. These track switches 47 are electrically connected to the selector carriage 16 to thus transfer the indexing and cancel solenoid circuits to either side thereof at the proper time in accordance with the direction of rotation of the record magazine.

To provide pockets for receiving the records 51, the magazine 6 is made up of a plurality of hollow sheet metal dividers 52 (Figs. 2 and 50) radially disposed in peripherally spaced relationship to define the outer part of the magazine drum. As best seen in Fig. 58, each divider 52 is formed of two identical stampings to facilitate manufacture, which are riveted together around their flanged margins and extend outwardly therefrom at top and bottom to provide a generally segmental cross-sectional shape transversely of the machine. Their outermost lateral surfaces are outwardly embossed to form a plurality of record-engaging pads 53 (Figs. 54 and 58), and the lower or radially inner portions of their marginal flanges have similarly formed pads 54, one adjacent each front and rear inner corner, and two spaced radially of the drum from each other and outwardly from each such single inner pad (Figs. 54, 55, 58 and 59). Each magazine drum casting 23 is provided with an annular flange 55 extending interiorly of the drum having radially disposed slots 56 and, outwardly therefrom, with an equal number of peripherally spaced, radial lugs 57 each having a radial slot 58 aligned with a slot 56. Each divider 52 is thus held rigidly between the hub castings 23, the several flange pads 54

being squeezed into the slots 56 and 58 by tightening of the nuts on the tie rods 24 during assembly of the parts. To positively prevent outward radial separation of the dividers 52 from the hub castings 23, their marginal flanges adjacent the flanges 55 may be provided with front and rear corner portions 59 (Fig. 54) underlying the flanges 55. It will thus be seen that a strong and rigid drum structure is provided which is, nevertheless, of minimum weight. To further reduce the weight, apertures 61 may be provided in the central portions of the dividers 52, as shown in Figs. 54 and 58.

In order to provide maximum protection for the records 51 and prevent any possibility of edge chipping thereof, each casting 26 has an annular pad 62 of foam rubber, or the like, between the lugs 57 and its flange 55 (Figs. 54, 55, and 57-59), and a rubber or other resilient ring or bead 63 extends around the outer peripheral flange of each casting 23. Means are provided for preventing the records 51 from falling downwardly out of the magazine 6 as the latter rotates and the records are carried below the horizontal plane through the drum axis 28. This record restraining means comprises a lock-in swivel plate 64 (Figs. 2 to 5, 54, 60 and 61) centrally pivoted on a mounting bracket 65 (Figs. 60 and 61), one such bracket 65 being riveted onto the outer edge of every other divider 52. Each plate 64 has two upwardly struck lugs 66, the rearward one of which is interconnected with the upturned rear end of bracket 65 by a coil spring 67, so that this spring normally retains lock-in swivel plate 64 in an inoperative position within the radial side planes of its mounting divider 52 and out of the path of movement of records into and out of the magazine. Secured by brackets 68 to the machine frame 5 is an arcuate cam strip 69 (Figs. 2-5) extending peripherally around a lower portion of the magazine drum 6 and spaced outwardly therefrom. The ends of this strip 69 extend well above the center of the drum and have their rear edges curved to cooperate with the forward lugs 66 (Fig. 4) as the latter move downwardly into engagement therewith, in both directions of rotation of the magazine, and against the action of springs 67 to move the lock-in plates to operative position substantially laterally of the machine. Each plate 64 is long enough to subtend the record-receiving spaces on each side of its supporting divider 52, and throughout the length of cam strip 69, the lock-in plates are maintained thereby in such active position to prevent any records falling from the magazine.

The selector unit assembly functions to index the magazine 6 and stop it in each instance when that particular record 51 therein which has been selected for playing reaches the uppermost position. As previously noted, this assembly comprises the stationary coil bank or drum 13 and the selector carriage 16. The drum 13 comprises a pair of front and rear frame plates 71 (Figs. 45, 48 and 49) suitably secured together in spaced relationship axially of shaft 28, which extends centrally therethrough, and supported upon the machine frame 5 by a mounting bracket 72 (Fig. 2). Between these frame plates 71 are secured in any desired manner a pair of inner and outer concentric rings 73 of suitable electrical insulating material, and terminal supporting segments 74 of like material are mounted on the outer surfaces of the frame plates. These segments 74 also support the selector coils 14 which are disposed interiorly of the drum between rings 73 and equally spaced peripherally of the drum. The associated selector levers 15 are formed and mounted as best seen in Figs. 44-47, each having an enlarged central portion providing a bottom shoulder engaged by a coil spring 75, interposed between it and inner ring 73, and an upper shoulder supporting a metal contact plate 76. The ends of each selection lever 15 extend through suitable apertures in the rings 73, that in the outer ring being considerably larger and numbered 77, so that the upper end of the lever 15 may be moved outwardly to its position of Fig. 45, in response to energization of its coil 14, and in-

wardly to its normal position engaging the inner (right-hand in Fig. 45) edge of hole 77, in response to movement of the associated spring plunger 19 by energization of its coil 18, as shown in Fig. 44. The spring 75 resiliently maintains the lever 15 in either of such outer or inner positions. Extending along the outer sides of the apertures 77 of each of the two front and rear rows (Fig. 49) of these apertures is a contact ring 78 (Figs. 44-47) mounted on the under surface of the outer insulation ring 73. Between the two rows of apertures 77 is a similar common contact ring 79 which is considerably thicker than the rings 78. With this arrangement, the contact plate 76 will be held out of engagement with its associated outer ring 78 by its engagement with center ring 79 when its selection lever is in its inner or inoperative position. Upon energization of its associated coil 14, movement thereby of lever 15 to its outer or operative position of Fig. 45 will cause plate 76 to contact its ring 78 as well as ring 79. These contact rings are so electrically connected in the machine circuit that such bridging thereof will energize a start relay 81 (Figs. 79 and 80) to turn on the amplifier, turntable motor 70 (through socket 82 of Fig. 79), and magazine motor 37 by the resulting closing of start relay contacts 83.

The resulting rotation of magazine 6, as previously described, carries with it the selector carriage 16 by means of arm 17. In Figs. 7, 40 and 54 it will be seen how the lower end of selector arm 17 is rigidly secured to the forward end of drive sleeve 27. The upper end of arm 17 has a U-shaped bracket 84 secured to it, in the arms of which (as best seen in Fig. 40) are mounted adjustable trunnion bolts 85 for supporting the main body portion of carriage 16, which is in the form of a block of electrical insulation material having depending corner portions 86 (Figs. 41-43) underlying marginal horizontal flanges on the stationary drum plates 71. As best seen in Fig. 43, the two selector lever cancel solenoids 18 are mounted annularly on the front and rear sides of the carriage 16. The core of each of these solenoids 18 is held in an outer or upper position by a coil spring 87 when the solenoid is de-energized. The inner end of the core carries the previously described coil spring plunger 19. Interiorly of the carriage 16 (Fig. 42) are mounted a pair of contact blocks 88 which may be adjusted longitudinally of the carriage individually to insure proper indexing. Each of these blocks carries a pair of switch contacts 89 which are adapted to be closed, respectively, by any selection lever 15 in the associated row thereof that has been moved to its outermost operative position, as shown at the right in Fig. 43. Rotation of the carriage is stopped whenever these contacts 89 thus are closed by an operated lever 15, such action closing a circuit to an interlock relay trip coil 91 (Figs. 78 and 80) to reposition its associated contacts 92. As previously noted, this stops the magazine motor 37, and closes a circuit to the gripper motor 11 to initiate delivery of the selected record from the magazine 6 to the turntable 7.

Referring to Figs. 2, 3, 7, and 38, the gripper motor 11 is shown as being mounted upon the previously described frame bracket 39, and, like the magazine motor 37, is drivingly associated with a suitable gear box or rotating drive pinion 93. As best seen in Figs. 38 and 39, this pinion 93 meshes with a gear 94 secured to the left end (Fig. 7) of the cam shaft 12. Another gear 95 (Figs. 38 and 39) drives a counter gear 96 mounting a stud co-operating with a slot in the rear end of a counter actuating lever 97. The lever 97 is U-shaped and pivotally supported on the machine frame adjacent its transverse portion below the turntable motor 70. The left-hand arm of this lever 97 is pivotally connected by a lever 98 (Figs. 2 and 3) to the operating arm of a counter 99. The ratios of the gears previously described are such that each cyclic actuation of cam shaft 12 causes one complete oscillation of gear 96. The resulting actuation of arm 97 will register one unit on the counter 99 so that this counter accumulates

the total number of selections played. The right-hand arm of lever 97 is pivotally connected at its rear end to a vertical slide 101, the lower end of which functions as a ratchet pawl to impart a single unit of incremental rotation to the particular one of a plurality of ratchet wheels 102 which happens to be laterally aligned therewith during its vertical operation by lever 97. The ratchet wheels 102 comprise a popularity meter, there being one for each side of each record in the magazine 6, and they are coaxially mounted (Fig. 2) for independent movement, as well as simultaneous movement by rotation of an axial shaft 100 for the purpose of zeroizing the meter as a whole. This meter is suspended from a rack bar 103 (Fig. 3) which, in turn, is slidably mounted for transverse movement relative to the front frame rail 5 by suitable rollers 104 (Fig. 2). Meshing with the teeth in the upper surface of this rack bar 103 is a gear 105 that is rigidly secured in any suitable manner to the forward end of magazine drive shaft 28. With this arrangement, rotation of the record magazine 6 is accompanied by corresponding lateral movement of the popularity meter to always insure a particular ratchet wheel 102 being aligned with the actuating slide 101 which corresponds to one certain record-receiving space in the magazine. Consequently, each time that a record is selected for play, the corresponding ratchet wheel 102 will be given one increment of rotation, whereby a visual record is available to the service man merely by opening up the front door 2 at any time to tell how many plays have been made on each of the records in the machine.

Referring back to cam shaft 12 which cyclically actuates the record delivery means and the tone arm, it will be seen from Figs. 7 and 40 that two cams 106 and 107 are mounted thereon adjacent the left side of the upright frame casting 33, which comprises a housing for the gripper mechanism hereafter described and also journals shaft 12. The outer cam 106 operates an associated cancel relay micro follow switch 108 (Figs. 78 and 80). Prior to the completion of the first half cycle of gripper cam shaft 12, the switch lever associated with this switch 108 falls into the groove in cam 106 to close a circuit to the proper carriage selector lever cancel solenoid 18. On the return cycle, this switch lever is moved to the outer part of cam 106 to actuate switch 108 to complete a secondary circuit to the coil 109 of a cancel relay having contacts 111 (Figs. 78 and 80), which prevents the relay from unlocking in the event that the main power fails momentarily for any reason. The inner cam 107 operates a start relay micro follow switch 112, the associated switch lever being in the groove of cam 107 when the delivery mechanism is in normal or home position. After indexing of the magazine 6 and the grip arm 9 proceeds to remove the selected record from the magazine, switch 112 disconnects the field of magazine motor 37 and connects a holding circuit to the start relay 81.

Also mounted on shaft 12, but to the right of housing 33, and secured thereto in any suitable manner, is a drive member 113 of a Geneva movement for actuating the gripper mechanism (Figs. 7 and 22). On the outer or right-hand side of this gripper drive member 113 are adjustably secured a grip stop switch inner cam 114 and a grip stop switch outer cam 115. A cam pin 116 (Figs. 7, 15, 18 and 24) is moved between a forward and a rear position (left and right in Fig. 24) by these cams, and is carried by an arm 117 pivoted at its lower end at 118 (Fig. 7) and having a pair of pins 119 for actuating a multi-pole grip cam limit switch 121 which is a snap-type switch having three segments or sets of contacts 122, 123, and 124 (Fig. 78).

In the normal or home position of the mechanism with the grip arm 9 over the magazine 6, the cam pin 116 is in its most forward position and all of the contacts of limit switch 121 are made to the rear of the machine. Referring to Fig. 80, the first set of contacts 122 then completes a circuit to the interlock trip coil 91 to allow indexing by the carriage contacts 89 whenever they strike a registered selection lever 15. The second set of con-

tacts 123 (Fig. 78) mutes the amplifier output. The third set 124 (Fig. 80) completes the two circuits to the magazine and grip motors 37 and 11. At the end of the first half of the cycle of cam shaft 12 when the jaws of the gripper arm open to release the selected record on the turntable, the members 114—119 function to snap switch 121, whereby all of its contacts are made to the front of the machine. Such repositioning of contacts 122 opens the circuit to the selection lever cancel solenoids 18 (Fig. 80) and also conditions cancel relay circuit for later use. The second set of contacts 123 then opens the amplifier muting circuit. The third set of contacts 124 (Fig. 80) then opens the two power motor circuits and closes a circuit to a release coil 125 of the interlock relay, thus releasing the interlock to its original position. To clarify the function of the previously described interlock relay, it should be noted that this is a mechanically latching type having two coils which have been designated as the trip coil 91 and the release coil 125. The trip coil armature has two single throw contacts 92 (Fig. 80), and the armature of release coil 125 has two double throw contacts 126. In the normal position, prior to indexing, the trip armature is relaxed and the release armature is mechanically latched down by an arm extending from the trip armature, with neither coil 91 or 125 being energized. The sequence of operation of this interlock relay will be given in detail hereafter.

The construction and operation of the sound reproducing means comprising the turntable 7 and tone arm 8 will now be described, with specific reference to Figs. 2, 4, and 6 through 14. On the right-hand end of cam shaft 12 (Figs. 2 and 6) is rigidly secured in any suitable manner a tone arm cam 127. The outer periphery of this cam 127 raises and lowers a tone arm cam plate 128 which is secured in the manner illustrated in Figs. 8 and 10 to the upper end of a vertical sleeve 129. This sleeve is supported for rotation and vertical translation on a shaft 131 secured to the horizontal portion of a bracket 132, in turn mounted upon the auxiliary housing 33. Suitable ball bearings are interposed between the shaft 131 and sleeve 129 to reduce to a minimum any friction resisting movement of the tone arm, and an adjusting screw 133 (Fig. 10) is provided to variably limit the downward movement of cam plate 128. Depending from this plate 128 are a pair of stop pins 134 (Figs. 6 and 8) which cooperate with the lateral cam edges of the tone arm cam 127, the pins straddling the cam to effect lateral movements of the tone arm toward and away from the turntable. Referring to Fig. 12, it will be seen that the lateral edge at the left side of cam 127 cooperates with the left pin 134 to move the tone arm into initial playing position to the left of its normal inoperative position as shown therein in full lines. During playing of the record, the tone arm is carried further to the left by the record to bring the stop pins 134 approximately to their broken line positions of Fig. 12. Reverse movement of cam 127 thereafter causes the lateral edge at the right side thereof to move the right pin 134 to return the tone arm laterally to its normal or inoperative position. A suitable leaf spring 135 (Figs. 8 and 12) is mounted on the right side of the tone arm cam 127 to prevent outward swinging of the tone arm as it is lifted from the record and to maintain the left pin 134 in engagement with the left side of the cam as the cam is moving the tone arm to the left toward playing position by resisting such movement by then being in the path of movement of the right-hand pin 134. This latter function is specifically illustrated in Fig. 9 which shows the position of the cam just prior to completion of inward movement of the tone arm to playing or record-engaging position. As will be appreciated, the peripheral surface of cam 127 is designed to raise and lower the tone arm out of and into engagement with a record on the turntable, Fig. 8 showing that position of the cam wherein the tone arm is at its highest point just prior to lowering of the needle onto

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the record, such being accomplished during the next few degrees of continued rotation clockwise of cam 127.

Secured to the forward portion of the tone arm cam plate 128 is a tone arm supporting bracket 136 on which the tone arm 8 is pivotally mounted by means of a pair of needle point trunnions 137 (Figs. 11 and 13), the right-hand one of which is adjustable. Pivotaly mounted on a transverse pin 138 extending through the bracket 136 are the arms of a spring bracket 139 which is disposed interiorly of bracket 136. The upper portion of bracket 139 has the forward end of a leaf spring 141 secured thereto, and the rear end of this spring presses upwardly against the rear end of tone arm 8 to counterbalance the weight of the latter on the trunnions 137. A lower depending portion of spring bracket 139 is contacted by the rear end of an adjusting screw 142 for varying the tension of spring 141 to adjust the needle pressure on the record. Means are also provided for limiting downward movement of the pick-up forward end of tone arm 8 comprising an adjustable screw 143 mounted in a forwardly extending shelf of bracket 136 which cooperates at its upper end with a heavy leaf spring 144 secured at its rear end to the upper transverse portion of the tone arm (Fig. 8). Radial adjustment of the tone arm about its pivot shaft 131 may be accomplished by means of a screw 144 (Figs. 8 and 9) having threaded engagement with the base of bracket 136 and extending upwardly through a slot 145 in the forward portion of the tone arm cam plate 128.

Referring now to Figs. 6, 8, and 14, a cam strap 146 is secured, as by welding or the like, to the lower portion of tone arm supporting sleeve 129 which carries an adjusting screw 147 at its outer end. The rear end of this screw 147 limits the movement (clockwise in Fig. 14) of an arm 148 extending laterally from a tone arm switch cut-off cam 149 that is pivotally mounted on the sleeve 129 below the strap 146. This cam 149 cooperates with a lever 151 for actuating a tone arm micro switch 152 at the end of a playing cycle when the needle reaches the customary cut-off groove in the record. A coil spring 153 resiliently maintains the adjusting screw 147 in contact with the arm 148. When the tone arm reaches the record cut-off groove, the lever 151 falls into the notch of cam 149 to start the gripper motor 11 (Fig. 80) through the cancel relay contacts 111. As previously described, the turntable motor 7 is energized upon closing of the circuit to the start relay coil 81 upon movement of any selector lever 15 to its outer operative position. Referring to Fig. 6, it will be seen that the upper end of the shaft of turntable motor 70 is knurled or otherwise somewhat roughened at 154 and frictionally engages the outer periphery of a drive wheel 155 which is rotatably mounted on a suitable horizontal frame shelf or bracket 156 to frictionally engage the inner surface of a depending peripheral flange on the turntable 7. The motor 70 is also supported by this frame shelf 156 and, as better seen in Fig. 8, the center pin 157 of the turntable is rotatably mounted within a suitable bearing 158 also supported by this frame bracket 156.

The record transfer mechanism comprising the gripper arm 9 and parts for cyclically operating the same will now be described. Referring to Figs. 3-5, 54 and 56, it will be seen that the lower end of a bracket arm 161 is secured to the rear bearing bracket 29. The upper end of this bracket 161 (Fig. 5) is bifurcated to guide, receive, and retain the free, normally rear, end of gripper arm 9 as the same is moved to and from its normal inoperative position. The arm 9 is substantially semicircular in shape to subtend the record magazine 6 and records 51 therein, and terminates at its normally forward end in a hollow shaft portion 162, as best seen in Figs. 19, 29, and 31, which is slidably and rotatably housed within the bore 163 extending front to rear of the machine through a spider 164 shown in perspective in Fig. 35. Transverse bore 165 in the gripper spider 164 rotatably receives a

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trunnion shaft 166 which is shown in perspective in Fig. 30. This shaft 166 is rotatably supported in suitable bearing portions comprising the upper side walls of the upright frame casting 33, and extends outwardly beyond the right-hand frame wall to rotatably support a flip cam 167 (Figs. 22 and 29). Outwardly of this flip cam 167 the shaft 166 has secured to it a gripper release cam 168, the cams 167 and 168 with the drive member 113 comprising the gripper Geneva movement previously referred to. Also forming a part of this Geneva movement are three long pins 169 and two short pins 171 extending to the left from and rigidly secured to the drive member 113 (Fig. 22) and spaced peripherally of the latter as shown in Fig. 16. Both sets of these pins cooperate with the slots in the Geneva cam 168, while only the longer pins 169 cooperate with the similar slots in the inner flip cam 167. Also peripherally cooperating with the latter is a segment cam 172 (Figs. 22, 25 and 26) which forms an integral part of the Geneva drive member 113 and functions to retain the flip cam 167 stationary during part of the transfer cycle while the gripper release cam 168 is rotating. The flip cam 167 is operatively connected to the spider 164 by a transverse pin 173 (Figs. 22 and 35). As best seen in Fig. 30, the central portion of the trunnion shaft 166 is cut away to leave only two transverse web members 174 which cooperate, respectively, with the forward end of the hollow shaft 162 (Figs. 19, 31, and 33) and the rear end of a grip arm guide and record-turning cam 175 which is slidably mounted in the forward end of the bore 163 of spider 164. This cam 175 has a normally vertical slot 176 in its outer surface which cooperates with a stationary cam lock 177 (Figs. 19 and 20) preferably formed as an integral extension of the frame casting 33. When the gripper arm 9 is in its normal inoperative position and during its forward swinging in the first portion of the delivery cycle, the stationary lug 177 rides in the slot 176 to prevent rotation of the cam 175. The hollow shaft portion 162 of the gripper arm 9 houses the inner end of an axially slidable gripper or jaw member 178 (Figs. 29 and 31), the other jaw member for peripherally engaging a record at a point diametrically opposite from that engaged by this jaw member 178 being the free end of the grip arm 9. This movable jaw member 178 is connected to the normally rearward end of a flattened rod 179 which extends through apertures of similar cross section in the inner ends of hollow shaft 162 and cam member 175, the other end of the rod having a pin 181 extending therethrough for locking the rod in the cam member 175 (Fig. 21). Interposed between the movable jaw member 178 and the inner end of hollow shaft 162 (Figs. 29 and 31) is a coil spring 182 tending to separate these members and to move them, along with cam 175, to their positions of Fig. 31. Rotational movement of trunnion shaft 166 to its position of Fig. 33, on the other hand, will separate the members 162 and 175 and move the jaw member 178 inwardly into shaft 162 against the action of spring 182. It will thus be seen that partial rotation of trunnion shaft 166 between its positions of Figs. 31 and 33 will effect gripping and release of a record between and from the movable jaw member 178 and the outer end of gripper arm 9. It will also be seen that this outer end of arm 9 will thus be moved relative to jaw member 178, since shaft 162 comprises an integral part of the arm so that the gripping action comprises a gentle grasping of diametrically opposed edge portions of the record simultaneously. These two positions of the jaw members are well illustrated in Fig. 29, wherein 9 and 178 are shown in their gripping position in full lines and in releasing position in broken lines. It will be appreciated that movements of the jaw members between these two positions is accomplished at the beginning and end of each half of the gripper or record delivery cycle, to engage and release a record in the magazine as shown in Fig. 19, and to deposit the record on and remove it from the turntable as

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shown in Fig. 29. And such actions are accomplished by movement of release cam 168 relative to flip cam 167 by the short pins 171 while segment cam 172 slidably engages an inwardly curved peripheral portion of cam 167. Each cycle of the record transfer mechanism, after indexing, starts with the parts in normal position of Fig. 4. Initial clockwise rotation of shaft 12 (from right side of machine) first grips the selected record and then flips it over onto the turntable 7. Figs. 25 and 32 show the positions of cams 167 and 168 just as the record is put on the turntable as the last pin 169 is disengaged from the cams and segmental cam 172 engages cam 167 to prevent its further movement with cam 168. Continued rotation of shaft 12 to the position of Fig. 26 moves cam 168 relative to cam 167 to release the record. After playing, shaft 12 starts rotating in the reverse direction, and the first portion of such action moves cam 168 relative to cam 167 to re-grip the record on the turntable, as shown in Fig. 15. Thereafter, both cams 167 and 168 rotate together to move shaft 166 and spider 164 together to flip the record through its position of Fig. 16 into the magazine, as shown in Fig. 18. The final portion of this second half of the record transfer cycle results in holding cam 167 and continuing movement of cam 168 to release the record and return all parts to normal position.

In addition to the above-described record flipping function, the instant record delivery or transfer mechanism turns the selected record ninety degrees from its vertical magazine indexed position, in one direction or the other, into a horizontal position to present the selected side upward on the turntable. This is accomplished through the agency of the record-turning cam 175, which is rotated ninety degrees around the axis of squared rod 179 between the positions of the parts of Fig. 22 (and Fig. 37) and those shown in Fig. 34. In Figs. 22 and 37, the axis of hollow shaft 162 is vertical, and in Fig. 34 it is approximately twenty degrees above the horizontal position assumed with the record on the turntable 7. The direction of such axial turning of cam 75 is predetermined by whether an odd or even numbered selection has been made, i. e., by whether the recording on the odd or even side of the selected record has been selected for playing. Such characteristic of the selection, as previously described, will determine whether the magazine 6 is indexed or stopped during its clockwise or counterclockwise rotation. Therefore, the position of arm 45, as determined by whether its roller 44 is in the outer or inner cam track 43, is employed to select the direction of axial rotative movement to be imparted to record-turning cam 175. In Fig. 7 arm 45 is in its right-hand position, while it is in its left-hand position in Fig. 50.

A forwardly extending stud 183 is mounted on the upper portion of arm 45 having a horizontal aperture through which a transverse rod 184 extends. This rod 184 has coil springs mounted on it at each side of stud 183, the outer ends of which are suitably prevented from moving relative to the rod, so that lateral shifting of the rod 184 by arm 45 is cushioned. The other end of rod 184 extends through a suitable aperture in the frame casting 33 (Fig. 40), and is pivotally connected to the rear end portion of a record-turning cam plate 185 (Fig. 22). As best seen in Figs. 19, 34, and 40, this plate 185 is pivotally suspended at its forward end from a transverse portion of frame casting 33 by a shouldered bolt 186, and its rear end is slidably supported in a suitable slot 187 in the frame. The cam plate 185 is provided with two angularly upstanding portions near the rear end, each of which mounts a cam pin 188. Movement of rod 184 to the right, as in Fig. 7, positions cam plate 185 in its full line position of Fig. 23 to make the left pin 188 active, while movement of rod 184 to the left-hand position of Fig. 50 makes the right pin 188 active, as shown in broken lines in Fig. 23. The active cam pin 188 cooperates with one or the other of a pair of oppositely angularly disposed cam grooves 189 in the record-turning

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cam 175 (Figs. 20 and 36). Thus, just after the central groove 176 has passed rearwardly out of contact with guide post 177 in moving a record toward the turntable, the parts are in their positions of Fig. 37, and the active cam pin 188 will be starting to move cam 175 by engagement with a wall of the associated groove 189. The axial turning of cam 175 will be that from the full line to the broken line position of Fig. 36, and, of course, in the opposite direction during the second half of the delivery cycle when the played record is being returned to the magazine. To insure proper positioning of the parts at the end of a turning movement as a record is delivered to the turntable, the hollow shaft portion 162 is provided with opposed slots 191 transverse to the gripper jaw 178 (Figs. 7 and 17) for camming or guiding engagement with the stationary cam lug 177.

The novel program holder 22 and associated mechanism which is mounted in the front door 2 of the casing (Fig. 1) is more specifically illustrated in Figs. 62-74. The holder proper comprises, in the present embodiment, a four-sided tubular frame made up of transverse members 192 bolted together (Fig. 62) and secured to the corner portions of hub plates 193 which are mounted on a supporting shaft 194. The ends of shaft 194 are rotatably supported by end plates 195 and 196 (Fig. 69) which are secured at their lower ends to a transverse bottom plate 197, the one end of which (right end in Fig. 72) is mounted on a vertical pivot 198 on the frame of the door 2. The lower end of the left end plate 195 extends outwardly through a stepped horizontal slot 199 (Fig. 73) in a door frame rail 201 and is resiliently held in its forward position by a coil spring 202. With this arrangement, the left end of the program holder, viewing Figs. 1 and 72 may be swung rearwardly about pivot 198 and against spring 202 and latched in an outer position (broken lines in Figs. 72 and 73) to clear the side wall of the casing door for program changing purposes.

Each transverse frame member 192 is formed, as best seen in Fig. 65, to slidably receive an elongated program strip 203, with leaf springs 204 (Fig. 71), which are mounted on the hub frame members 193, pressing outwardly against the strips 203 to hold the same removably in place. The spring latches 204 at the left end of the frame engage in apertures 205 (Fig. 70) in the strips 203. Any strip 203 thus may be slid endwise out of the holder frame when the latter is moved to its broken line position of Fig. 72. Each strip 203 is provided with a plurality of up-struck tabs 206 (Figs. 66-68) in angularly disposed and parallel rows to receive and retain paper slips 207 in oblique echelon relationship to each other. Raised slip end-holding tabs 208 are also provided, over which the slips 207 may be slid in removing and inserting them. Each slip 207 contains identifying indicia for two recordings, and the arrangement is such, as seen in Fig. 66, that odd selection numbers on the bottom and even selection numbers on the top marginal portions of the strip 203 are aligned with the proper indices and separated by the corner portions thereof. These indices on each strip 203 also are visually aligned with their respective push buttons or manual selector keys 21 on the front of the door 2 when the holder 22 is in its operative position of Fig. 1 and that strip 203 is visible from the front of the door (from the right side of Fig. 62). Such arrangement is also illustrated in Fig. 74 to better show the visual alignment of each key 21, its identifying number on the strip 203 and its identifying indicia on the associated slip 207.

Mounted on the right end plate 196 (Figs. 63 and 69) is a program drive motor 209 is connected by means of a gear train 211 to drive the shaft 194. Mounted on shaft 204 are two program cams 212 and 213. As shown in Fig. 63, cam 212 has a single dwell which permits opening of any one of four multi-contact program transfer switches 214 mounted on the frame plate 196 which are normally held open by the cam. As shown in Fig. 64,

cam 213 has four dwells for permitting closing of one pair of contacts 215 and opening of another set of contacts 216. The circuits for these several parts are shown in Fig. 77 in connection with a manually operable program change switch 217, change coil 218 and switch 219 operated thereby. This arrangement results in operation of motor 209 when manual switch 217 is closed to rotate the program holder 22 to bring the next strip 203 into proper registration with selector buttons 21. As shaft 194 is rotated, a high point on cam 213 opens switch 215 to cut out the selector switches 221 (Fig. 75) operable by push buttons 21, and closes switch 216 to continue cyclic operation of motor 209 and render manual switch 217 inoperative by closing the circuit to coil 218 which changes the position of switch 219. At the same time, the formerly closed set of program transfer switches 214 are opened by cam 212. When the next strip 203 comes into proper position, the next dwell in cam 213 stops the motor 209 and returns the parts to normal, as in Fig. 77, and the dwell of cam 212 permits the next set of switches 214 associated therewith to close. These switches 214 correspond in function to the page switches 83 and 84 of my copending application Serial No. 392,265, filed November 16, 1953. For convenience of operation and servicing, a manual selection cancel switch 222, main service switch 223 and record loading switch 224 also are arranged in the machine circuit, as shown in Figs. 78 and 80. A bank of coin operated switches 225 are shown in Fig. 75 which cause actuation of the accumulator, and this view also illustrates the "make selection light" 226.

Reference has been made from time to time to various of the figures illustrating the machine circuits. In view of the complexity of these circuits, it has been found necessary to employ several sets of drawings for their different portions. The circuits illustrated in Figs. 75 through 79 are electrically interconnected in the following manner. The sockets AS and BS in Fig. 75 are connected to the plugs AP and BP in Fig. 77. The sockets CS and DS of Fig. 75 are connected to the plugs CP and DP of Fig. 76. The socket ES of Fig. 75 is connected to the coil actuated accumulator unit. The socket FS of Fig. 77 is connected to the plug FP of Fig. 79, and the socket GS of Fig. 77 is connected to the plug GP of Fig. 78.

Figs. 80 through 88 of the drawings comprise illustrative and descriptive resumes of the complete machine cycle in nine phases or sequences. These figures have been provided as a complete and detailed summary of the machine operation.

It is thought that the invention and its attendant advantages will be understood from the foregoing description, and it will be apparent that various changes may be made in the form, construction and arrangement of the parts without departing from the spirit and scope of the invention or sacrificing all of its material advantages, the forms hereinbefore described and illustrated in the drawings being merely preferred embodiments thereof.

I claim:

1. A multi-record automatic phonograph, comprising a horizontal turntable, record reproducing means for playing a disc record on said turntable, a drum type magazine for storing a large number of disc records radially therein and mounted for rotation on a horizontal axis, selector means for predetermining for playing either face of any said record in said magazine, said selector means being operable to initiate rotation in either direction of said magazine drum and to stop the same to present the record with the predetermined face to an indexed position with that face in a substantially vertical plane, and record transfer means operable in response to such indexing of said magazine to move the record with the predetermined face from indexed position in a substantially vertical plane out of said magazine, including means setttable in response to the direction of rotation of said magazine

prior to such stopping to rotate said record with the predetermined face into a horizontal position on said turntable to present the record with said predetermined face uppermost for playing.

2. In a multi-record automatic phonograph, a selector unit, comprising a hollow drum, a plurality of selector levers mounted radially within said drum in two parallel rows spaced axially of said drum, said levers in each row being spaced peripherally of said drum from each other, means for normally maintaining said levers in an inner inoperative position, and a plurality of selector coils in said drum, each said coil being associated with one of said levers for moving the same toward an end of said drum to an outer operative position upon energization of the associated coil.

3. In a multi-record automatic phonograph according to claim 2, a rotatable record magazine, means for rotating said magazine in response to movement of any of said selector levers to an outer position, a selector carriage mounted for movement around the periphery of said drum as an incident to the rotation of said magazine and stop means including a member carried by said carriage and cooperating with any operated selector lever to actuate said stop means for simultaneously stopping said carriage and magazine at particular points determined by such operated lever.

4. In a multi-record automatic phonograph according to claim 3, record reproducer means, reproducer moving means for placing said reproducer means in operative position, and means carried by said selector carriage for cooperation with any operated selector lever to initiate operation of said reproducer moving means.

5. In an automatic phonograph, a drum type magazine for storing a large number of disc records radially therein, including a plurality of hollow, sheet metal dividers of segmental shape transversely of an end of the drum, a pair of hub plates having means for engaging marginal portions of said dividers and maintaining the same in peripherally spaced relationship to provide a radially extending disc-record receiving space between adjacent dividers, each said record receiving space being of substantially uniform width throughout its depth radially of said magazine, and tie rods for securing said hub plates and said dividers together as a rigid structure, horizontal shaft means for rotatably supporting said magazine, and record lock-in means, comprising a swivel member mounted on the outer ends of alternate ones of said dividers for subtending record-receiving spaces adjacent thereto at opposite sides thereof, spring means for maintaining said swivel members in inoperative position, and stationary cam means extending peripherally around the lower portion of said magazine for moving said swivel members against the action of said spring means into a transverse operative position and maintaining the same therein.

6. In an automatic phonograph, a drum type magazine for storing a large number of disc records radially therein, drive means for rotating said magazine to present a selected record at an indexed position, record playing means, transfer means for delivering records from said magazine to said playing means, actuating means for said transfer means, a record play counter comprising a plurality of co-axially mounted register elements, a counter actuating member operable by the transfer actuating means each time it actuates said transfer means to deliver a record to said playing means, and means driven by the magazine drive means for bodily moving said counter and the register elements thereof in response to operation of said magazine drive means synchronously with said magazine to present that register element in operative relationship to said counter actuating member which corresponds to the selected record moved to indexed position.

7. In an automatic multi-record phonograph, record playing apparatus including record rotating means and reproducer means cooperable with said rotating means

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for playing one record at a time, a drum-type magazine adapted to carry a plurality of disc records arranged about its axis with their faces extending along radii of the magazine, record transfer means in registration with a record position in said magazine and swingable in a direction parallel to the faces of any said record in registration therewith to move that record from said magazine to said record rotating means, said magazine being mounted for rotation with its axis coplanar and normal to the axis of rotation of said record rotating means whereby any record in said magazine is movable into registration with said transfer means, an electric motor adapted when energized to rotate said magazine, a selector operable to predetermine for playing any record in said magazine and to cause the energization of said motor, and electrical switch means including a member rotatable by said magazine about the magazine axis and governed in part by said selector to actuate said switch means for stopping said magazine with the predetermined record in registration with said transfer means.

8. In an automatic multi-record phonograph as set forth in claim 7 wherein there is provided means actuated by said reproducer means upon the completion of the playing of a record for actuating said transfer means to return the played record from said record rotating means to said magazine.

9. In an automatic multi-record phonograph, record playing means including record rotating mechanism and reproducer mechanism cooperable with said record rotating mechanism for playing one disc record at a time, a record magazine mounted for rotation about an axis coplanar with and normal to the axis of rotation of said record rotating mechanism and having a plurality of record-receiving pockets radially arranged about the axis of rotation of said magazine, each said pocket being adapted to carry a disc record in radial position with respect to the last said axis, electric motor means for rotating said magazine and the records carried therein, selector means operable to predetermine for play any record in said magazine and including electrical switch means for actuating said motor means, selector control means for operating said selector means and said switch means, magazine position control switch means for stopping said motor means, switch actuating means having a drive transmitting connection with said magazine for movement thereby, said switch actuating means being governed in part by said selector means and controlling said magazine position control switch means for stopping said electric motor means and said magazine with said predetermined record in a transfer position, and transfer means actuated by said magazine position control switch means when the magazine is stopped with the predetermined record in the transfer position for moving that record from said magazine to said record rotating mechanism for playing the predetermined record, each said record receiving pocket being adapted to receive a record with a recording on each of its opposite faces, and said transfer mechanism including a disc-record gripper having a longitudinal axis in the plane including the axes of rotation of said magazine and record rotating mechanism, said gripper being pivoted to swing between said magazine and record rotating mechanism about an axis at an end of said longitudinal axis and adapted to grip a disc record in the transfer position and during its movement therefrom to said record rotating mechanism.

10. In an automatic multi-record phonograph as set forth in claim 9 wherein said gripper is mounted for selective rotation in opposite directions about said longitudinal axis while said transfer means is swinging said record from said magazine to said record rotating mechanism to arrange said record with either face thereof in playing relationship to said playing means.

11. In an automatic multi-record phonograph for playing disc records, a rotatable turntable adapted to receive and rotate a disc record, a reproducer cooperable with

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said turntable for reproducing a record rotated thereby, a drum-type magazine mounted for rotation about an axis coplanar with and normal to the axis of rotation of said turntable and having a plurality of record receiving pockets each having a width greater than the thickness of a record and adapted to carry a disc record, means in each said pocket for removably maintaining the record in a definite position therein with one of its diameters parallel and another of its diameters normal to the axis of rotation of said magazine, record transfer means for transferring one record at a time from said magazine to said turntable, selector means operable to predetermine any record in said magazine for transfer by said transfer means, operating means for said selector means, an electric motor controlled in part by said selector means for rotating said magazine, switch means including a member connected to said magazine for rotation thereby and governed by said selector means and controlling said switch means for stopping said magazine with the predetermined record therein at a transfer position, and means controlled by said switch means for actuating said transfer means to transfer the predetermined record from said transfer position in the magazine to said turntable.

12. In an automatic multi-record phonograph, a drum type magazine adapted to carry a plurality of disc records radially thereof, drive means for rotating said magazine to present any one of said records to a transfer position, record playing means for playing disc records, transfer means for delivering a disc record from said transfer position to said playing means, a plurality of record play indicators respectively corresponding to said records and individually operable to indicate the plays of the respectively corresponding records, means mounting said indicators in proximity to one another and for movement together as a unit whereby each of said indicators is movable to a predetermined position common to all of said indicators, means for operating any said indicator at said predetermined position, and means driven with said magazine by said drive means for moving said indicators together as a unit to dispose in said predetermined position the indicator corresponding to the record presented to said transfer position.

13. In an automatic multi-record phonograph, a rotatable drum having a plurality of circumferentially spaced and radially extending pockets therein, each said pocket having a record receiving and exit opening in a peripheral surface of the drum and record supporting means and being adapted to receive and carry a disc record with its faces extending substantially radially of said drum and substantially normal to the ends thereof, a shaft secured in coaxial relationship to said drum for rotation therewith, drum driving means for rotating said drum and thereby to move all of the records therein through a transfer position wherein the faces of a said record as it is moved through said transfer position are substantially vertical, drum position control means on said shaft and controlling said drum driving means for stopping said drum with any record carried thereby in said transfer position, disc-record playing means spaced outwardly beyond an end of said drum in an axial projection thereof, and record transfer means pivoted on an axis normal to the axis of said shaft and between said record playing means and the adjacent end of said drum, said transfer means being controlled by said drum position control means for moving any said record edgewise from said transfer position out of its drum pocket through the record receiving and exit opening thereof when said drum is stopped by said drum position control means and placing that record in playing relationship with said disc-record playing means.

14. An automatic multi-record phonograph comprising a rotatable magazine drum adapted to receive and carry therein a plurality of disc records circumferentially spaced about the drum axis and with their faces extending substantially radially of the drum and substantially normal

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to the ends thereof, electric motor means for rotating said drum, disc-record playing means spaced outwardly beyond an end of said drum in an axial projection thereof, a selector drum fixed in coaxial relationship with said magazine drum, said selector drum including selector switch means operable to start said motor means and switch contact members settable to predetermine for playing any record in said magazine drum, motor-stopping switch means, a selector carriage adjacent said selector drum and rotatable by said magazine drum about the axis thereof, said selector carriage including a contact member rotatable therewith to engage any said switch contact member in its set position for actuating said motor-stopping switch means to stop said motor means and said magazine drum with a predetermined record in a transfer position, and record transfer means actuated by the engagement of any said switch contact member by the rotatable contact member when said magazine drum is stopped for delivering said predetermined record from said transfer position to said disc record playing means.

15. In an automatic multi-record phonograph, a rotatable disc-record magazine drum having a plurality of circumferentially spaced and radially extending pockets therein, each said pocket having a record receiving and exit opening in an outer surface of said drum and record supporting means and being adapted removably to receive and carry a disc record with its faces extending substantially radially of said drum and substantially normal to the ends thereof, a shaft secured to said drum coaxially thereof for rotation therewith, driving means for rotatably indexing said drum to present any record therein to an indexed position wherein the record receiving and exit opening of the drum pocket carrying said record is in the uppermost outer surface of said drum and the faces of the record in the last said pocket are in substantially vertical planes, and selector means mounted coaxially with said shaft and controlling said driving means for initiating the indexing of said drum and for predetermining the record therein to be presented to said indexed position, said selector means including an operating member mounted on and rotatable by said shaft and controlling said driving means for stopping said drum with the predetermined record in said indexed position and a plurality of selector members annularly arranged about and in coaxial relationship with said drum and shaft and respectively corresponding to the pockets of said drum, each said selector member being mounted for movement to and from a position for initiating the indexing of said drum by said driving means, said operating member being movable by said shaft into engagement with any said selector member in its indexing initiating position, and means actuated by the engagement of said operating member with any said selector member for stopping said drum with the record corresponding to the engaged selector member in said indexed position.

16. In an automatic multi-record phonograph, a rotatable magazine shaft, a drum type magazine mounted on said shaft for rotation therewith and having a plurality of circumferentially spaced and radially extending pockets, each said pocket having a disc-record receiving and exit opening in an outer surface of said magazine and being adapted to receive and carry a disc record with a plane parallel to and intermediate the faces of said record including the axis of rotation of said magazine, a rotatable turntable shaft having its axis normal to and coplanar with the axis of said magazine shaft, disc record rotating means fixed on and rotatable with said turntable shaft for receiving and rotating a disc record at playing speed, said disc record rotating means being spaced outwardly beyond an end of said magazine in an axial projection thereof, record reproducer means spaced from said rotating means, said reproducer means being movable to and from engagement with a record received by said rotating means and adapted to play said record while in engagement therewith, an electric motor geared to said magazine

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for rotating the same to rotate said magazine shaft and to move any record in said magazine to a transfer position wherein the plane including the axes of said magazine and turntable shafts extends in parallel relationship with and between the faces of said record, a rotatable transfer shaft normal to the plane including the axes of said magazine and turntable shafts and mounted for rotation between said rotating means and the adjacent end of said magazine, transfer means on said transfer shaft and adjacent said magazine, said transfer means being positioned in registration with said transfer position and rotatable with said transfer shaft for moving any record in said transfer position edgewise out of its magazine pocket, through the record receiving and exit opening thereof, and thereafter moving said record to said rotating means and for returning a record from said rotating means to said magazine pocket, through the record receiving and exit opening thereof, driving means for rotating said transfer shaft, a selector including a plurality of switches corresponding in number to the number of records in said magazine, said switches being selectively operable to predetermine for playing any record in said magazine and, upon operation of any said switch, to initiate the operation of said motor for rotating said magazine and said magazine shaft, a motor-stop switch operable to stop said motor whereby to stop said magazine, and magazine position control means having a drive transmitting connection on and movable by said magazine shaft and a member movable by said connection synchronously with said magazine and governed by said selector for actuating said motor-stop switch to stop said magazine with any record predetermined by said selector in said transfer position.

17. In an automatic multi-record phonograph as set forth in claim 16, means on and rotatable with said transfer shaft for moving said reproducer means to playing relationship with a record carried by said rotating means.

18. In an automatic multi-record phonograph as set forth in claim 16, reproducer return means on and rotatable with said transfer shaft for moving said reproducer means out of engagement with a record carried by said rotating means, and means operated by said reproducer means upon completion of the playing of said record for actuating the transfer driving means to operate said reproducer return means.

19. In an automatic multi-record phonograph as set forth in claim 16, wherein said selector includes a plurality of selectively operable switch operating elements respectively corresponding to the switches of said selector and mounted in spaced relationship from each other about said magazine shaft and coaxially therewith, and said drive transmitting connection is fixed on and rotatable by said magazine shaft and carries said member in cooperative relationship with said switches.

20. In an automatic, multi-record phonograph for playing disc records, record playing means, a drum-type magazine having substantially cylindrical hub means and a plurality of dividers secured thereto in equi-spaced relationship about the circumference thereof, said dividers extending, in one direction, radially, and, in another direction, longitudinally of said hub means and providing a plurality of disc-record receiving pockets in alternating relationship with said dividers, each said pocket having a width, measured between adjacent dividers at the opposite sides thereof, greater than the thickness of a disc record and being adapted to receive a disc record with its faces extending longitudinally of said hub means, means mounting said magazine for rotation about the axis of said hub means to rotate said pockets to a transfer position common to all of said pockets, transfer means for removing the record from any said pocket in said transfer position if said record is in registration with said transfer means and moving that record to said playing means, magazine drive means for rotating and stopping said magazine to position any said pocket in said transfer position, and record positioning means carried by said dividers, said

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record positioning means extending into each said pocket and having members engageable by spaced portions of the respective faces of a record in said pocket to provide therein a record-receiving space with a width substantially equal to the thickness of the record therein for removably maintaining said record in such a position in said pocket that said record is in registration with said transfer means when said pocket is in said transfer position.

21. In an automatic, multi-record phonograph for playing disc records as set forth in claim 20 wherein gear means fixed on and in coaxial relationship with said hub means is engageable by said magazine drive means for driving said magazine.

22. In an automatic, multi-record phonograph, a drum-type magazine mounted for rotation about a horizontal axis and having a plurality of circumferentially spaced pockets respectively extending, in one direction, longitudinally, and, in another direction, radially of said magazine, each said pocket having a width transversely of said axis greater than the thickness of a disc record and an open end at the periphery of said magazine and being adapted removably to receive and carry a disc record with its faces substantially parallel to said axis, record retaining means engageable by the records in said pockets below said horizontal axis for preventing records from falling out of said pockets, and record positioning means carried by the side walls of said pockets and extending into each said pocket transversely thereof, said record positioning means having members engageable by spaced portions of the respective faces of a record in said pocket, for removably maintaining the record in spaced relationship with the opposite sides of said pocket during rotation of said magazine.

23. In an automatic, multi-record phonograph as set forth in claim 22 wherein mounting means mounts said record retaining means adjacent the periphery of said magazine for movement synchronously with the records engaging said retaining means.

24. In a multi-record, automatic phonograph, a rotatable magazine adapted removably to carry therein a plurality of disc records angularly spaced about the axis of rotation of said magazine with their faces extending substantially radially thereof, record playing means for playing the records in said magazine, transfer means adjacent said magazine for moving any said record in registration with said transfer means from said magazine to said record playing means for playing thereby, annular selector mounting means, a plurality of selector elements secured to said mounting means in angularly spaced relationship about the axis of said mounting means and radially thereof and corresponding in number to the number of records in said magazine, each said selector element being mounted for reciprocation, in a direction substantially parallel to the last said axis, from a non-selecting position to a selecting position, to predetermine for playing the record corresponding to said selector element, and back to said non-selecting position, holding means for removably maintaining said selector elements in their respective selecting and non-selecting positions, electromagnetic coil means mounted coaxially of said mounting means for selectively moving said selector elements to their respective selecting positions, driving means actuated by any said selector element when it is moved to its selecting position for rotating said magazine, and magazine position control means governed by said selector element in its selecting position for stopping said driving means to stop said magazine with the record corresponding to said selector element in registration with said transfer means.

25. In a multi-record, automatic phonograph, as set forth in claim 24 wherein transfer actuating means governed by any selector element in its selecting position actuates said transfer means when said magazine is stopped by said magazine position control means.

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26. In a multi-record, automatic phonograph as set forth in claim 25 wherein means actuated by said transfer means as the selected record is moved to said record playing means returns the corresponding selector element to its non-selecting position.

27. In a multi-record, automatic phonograph as set forth in claim 24 wherein a member driven by said magazine and engageable with any said selector element in its selecting position actuates said magazine position control means.

28. In a multi-record, automatic phonograph, a rotatable drum-type magazine for carrying a plurality of disc records radially therein and having shaft means secured in coaxial relationship to said magazine for rotation therewith, driving means for rotating said magazine whereby any record therein is presentable to an indexed position, a stationary annular member mounted in coaxial relationship with said magazine, a plurality of selector members mounted on said annular member in angularly spaced relationship about and coaxial with said shaft means radially outwardly therefrom and respectively corresponding in number and positions to the number and positions of the recordings on the obverse faces of the records in said magazine, another plurality of selector members mounted on said annular member in angularly spaced relationship about and coaxial with said shaft means radially outwardly therefrom and respectively corresponding in number and positions to the number and positions of the recordings on the reverse faces of the records in said magazine, said selector members being selectively operable to predetermine the record bearing the predetermined recording to be presented to said indexed position and to actuate said driving means, and selector carriage means connected by said shaft means to said magazine for movement thereby and having means engageable with any operated selector member for stopping said magazine with the record bearing the predetermined recording in said indexed position.

29. In an automatic multi-record phonograph, record playing means for playing one record at a time, a drum-type magazine adapted to carry a plurality of records radially arranged about the axis thereof, record transfer means adjacent a record position in said magazine and operable to move any said record in registration therewith from said magazine to playing relationship with said record playing means, said magazine being mounted for rotation whereby any record therein is movable into registration with said transfer means, a shaft secured to said magazine in coaxial relationship therewith for rotation thereby, an electric motor adapted when energized to rotate said magazine, selector switch means operable to cause the energization of said motor and having a plurality of switch contact members respectively corresponding to the records in said magazine, said switch contact members being selectively settable by said switch means in individual record predetermining positions to predetermine for playing the respectively corresponding records in said magazine, and magazine position control switch means including a contact member connected by said shaft to said magazine for movement thereby into engagement with any said switch contact member in its set position to actuate said magazine position control switch means for stopping said magazine with the record corresponding to the engaged switch contact member in registration with said transfer means.

30. In an automatic multi-record phonograph as set forth in claim 29 wherein said selector switch means is operable to move any plurality of said switch contact members to their record predetermining positions for predetermining the respectively corresponding records, and said contact member is successively movable into engagement with the switch contact members in said plurality thereof to actuate said magazine position control switch means for successively stopping said magazine with the

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records respectively corresponding to the engaged switch
contact members in registration with said transfer means.

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