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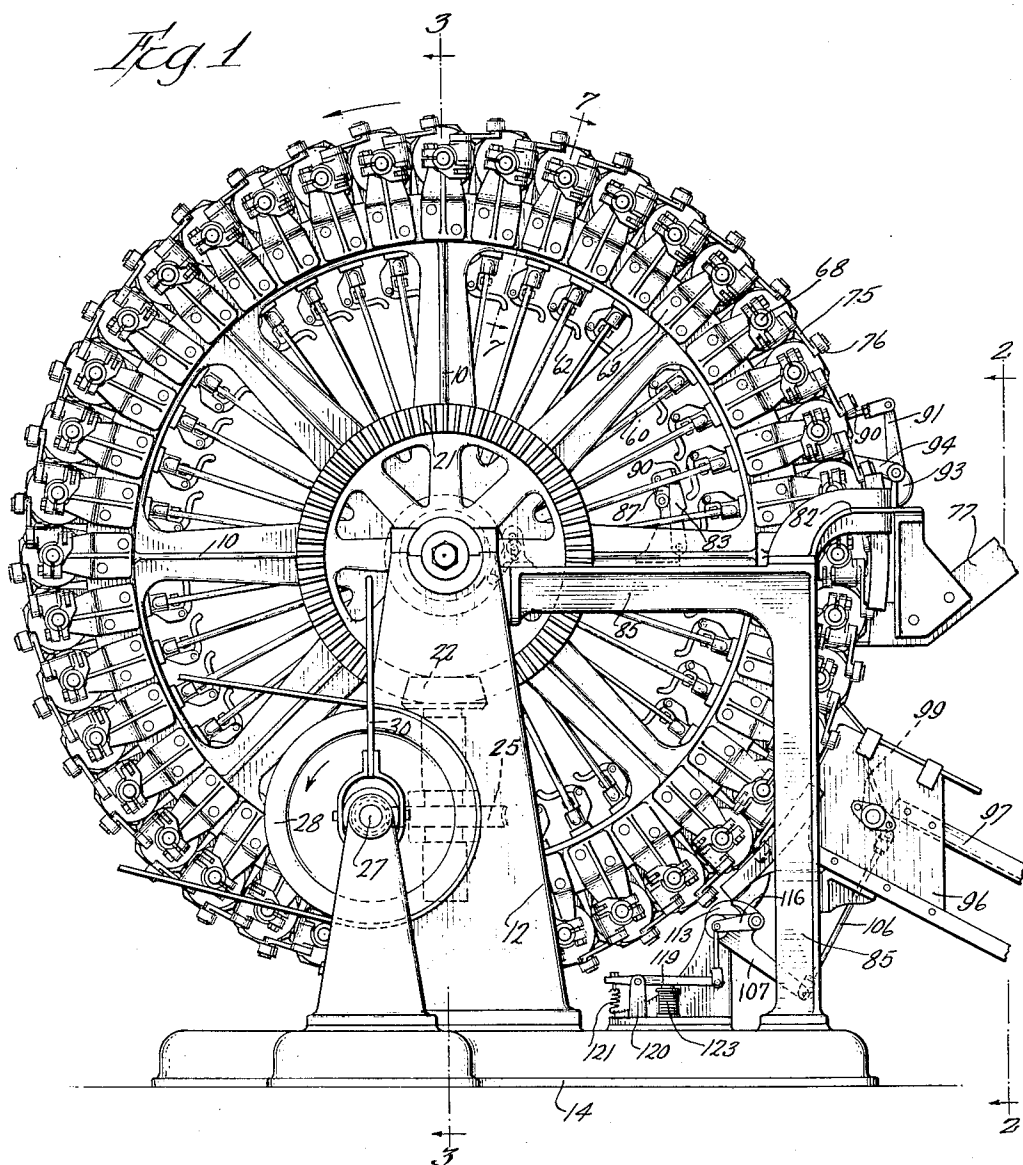
S. N. TEVANDER

1,845,362

CAN TESTER

Filed May 2, 1927

8 Sheets-Sheet 1



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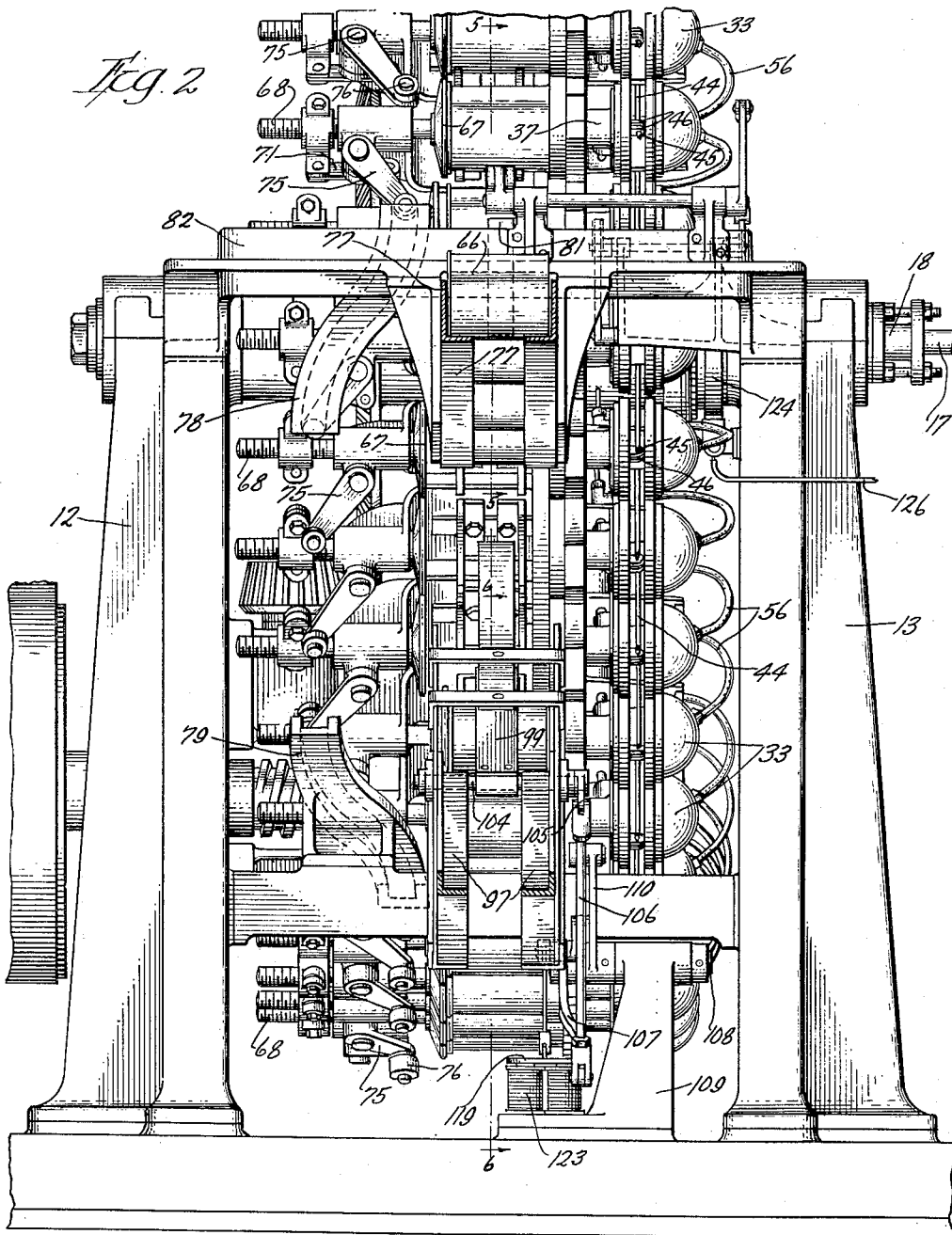
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8 Sheets-Sheet 2



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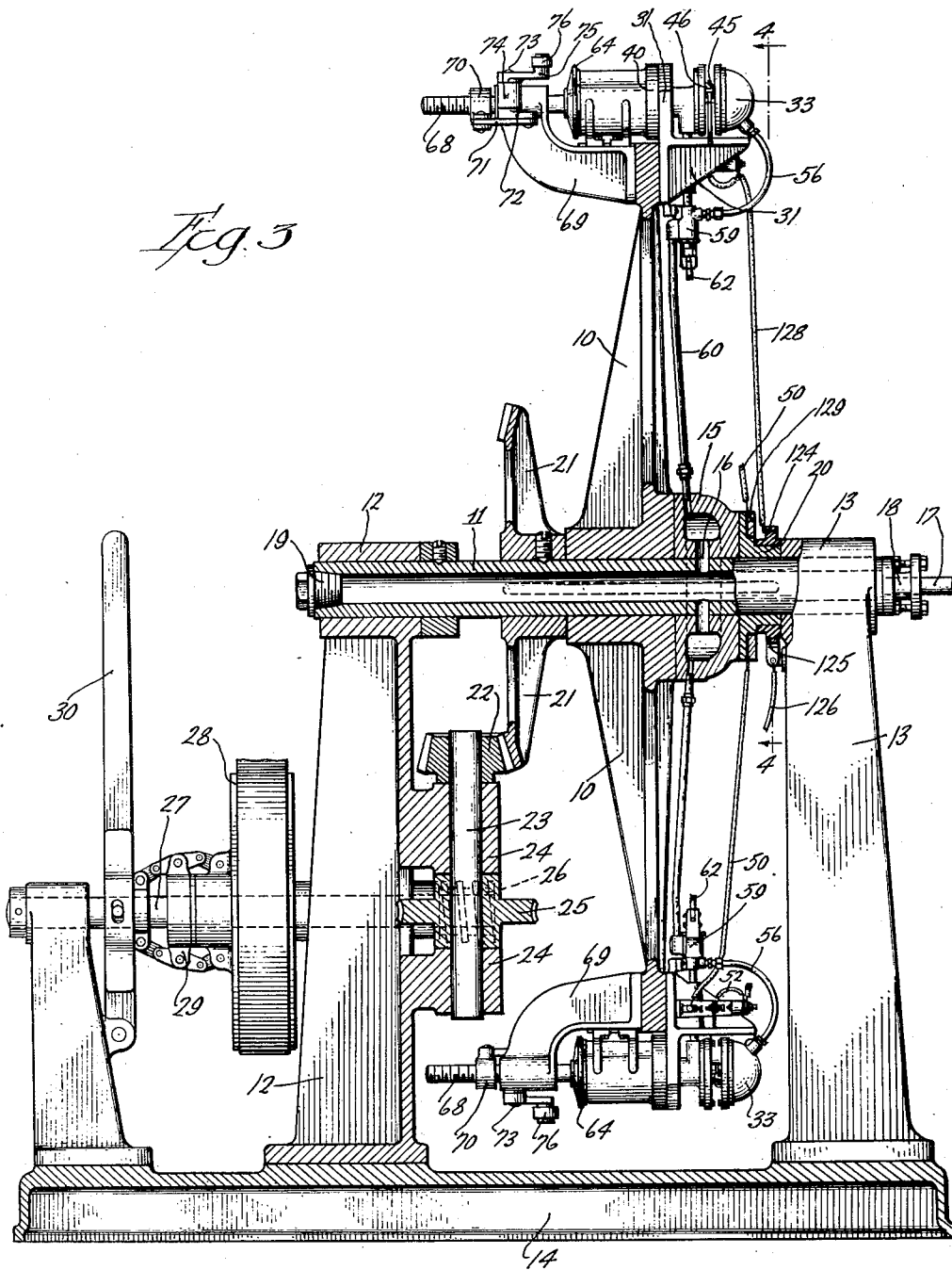
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CAN TESTER

Filed May 2, 1927

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Fig. 3



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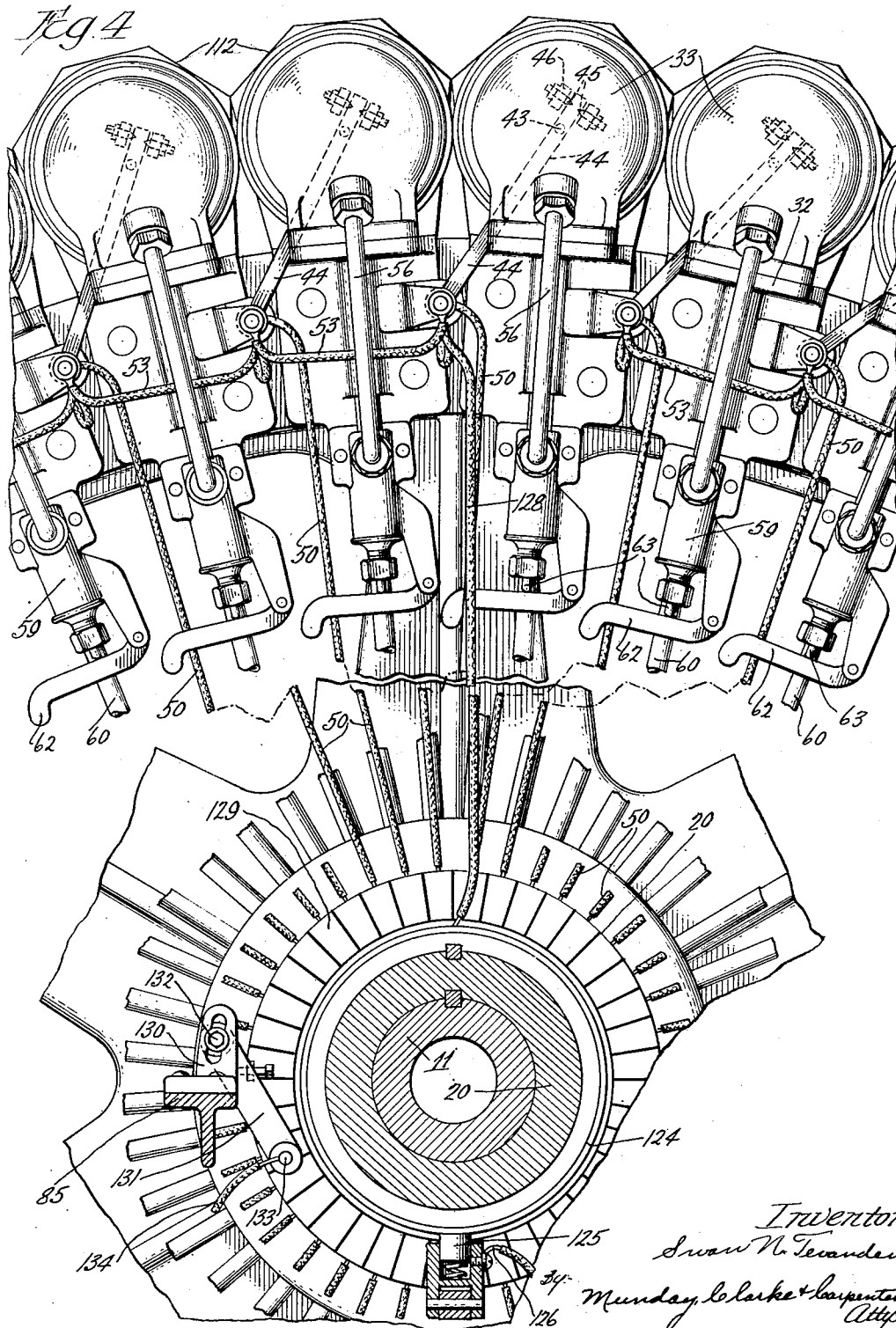
S. N. TEVANDER

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S. N. TEVANDER

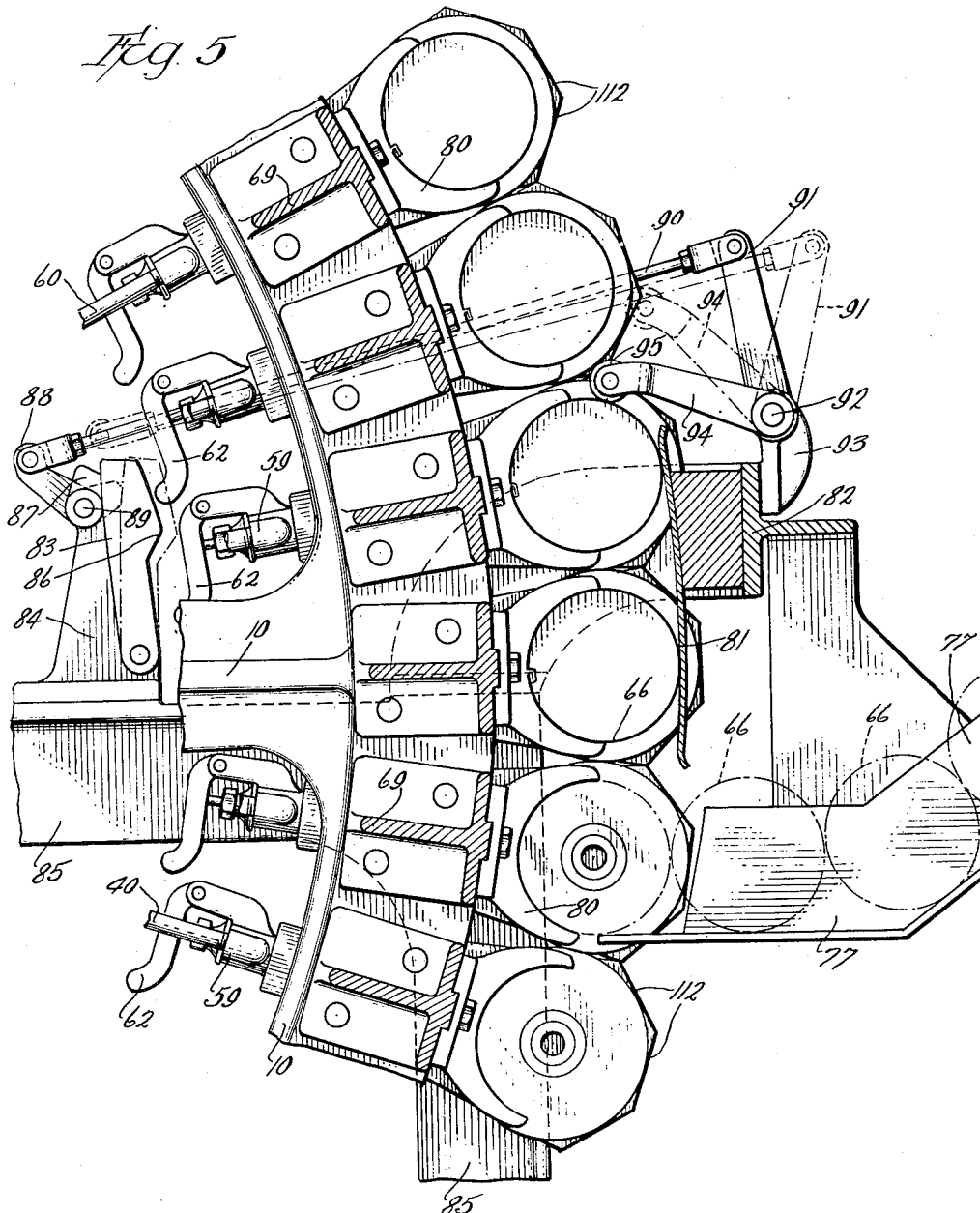
1,845,362

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Filed May 2, 1927

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Fig. 5



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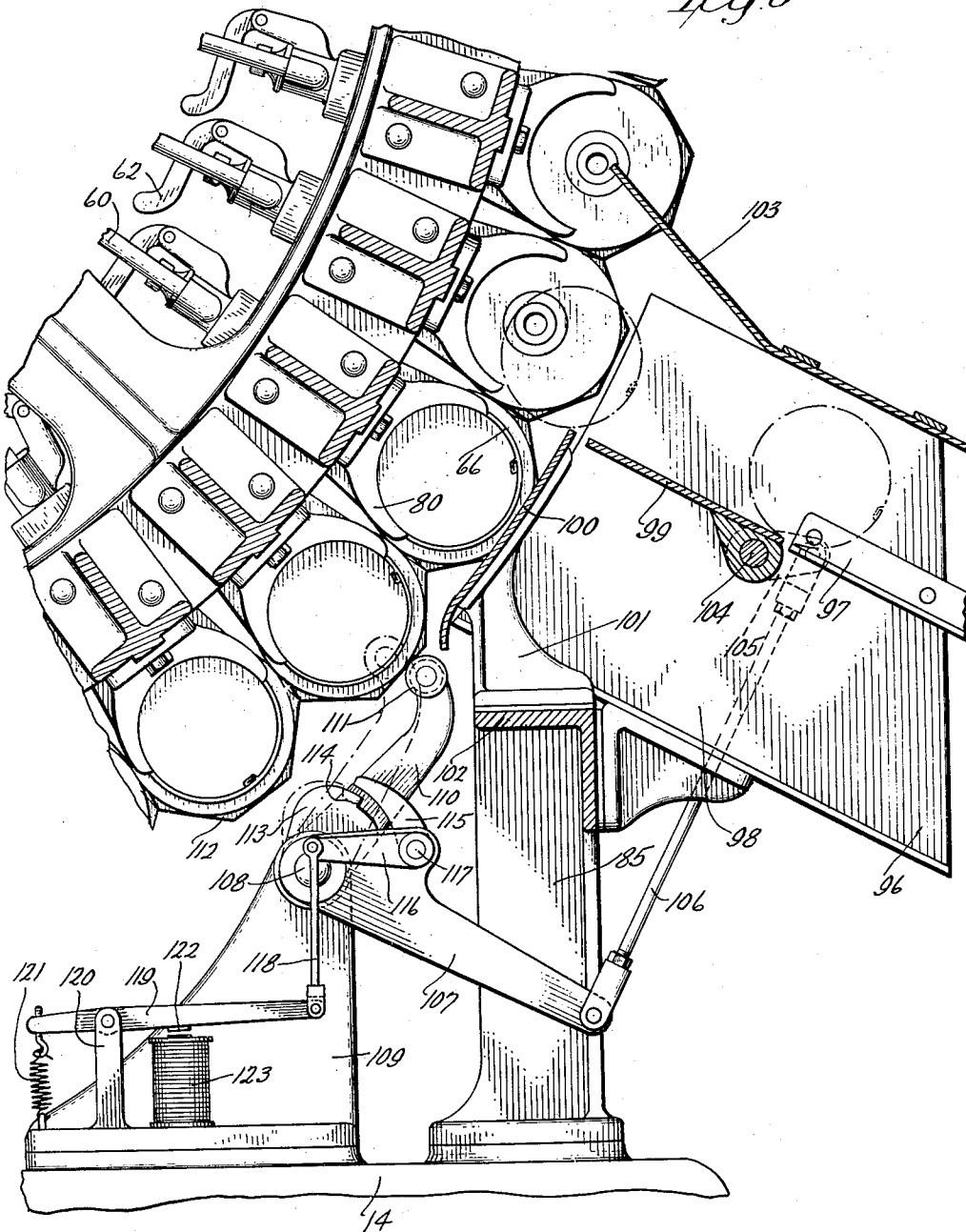
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Filed May 2, 1927

8 Sheets-Sheet 6

Fig. 6



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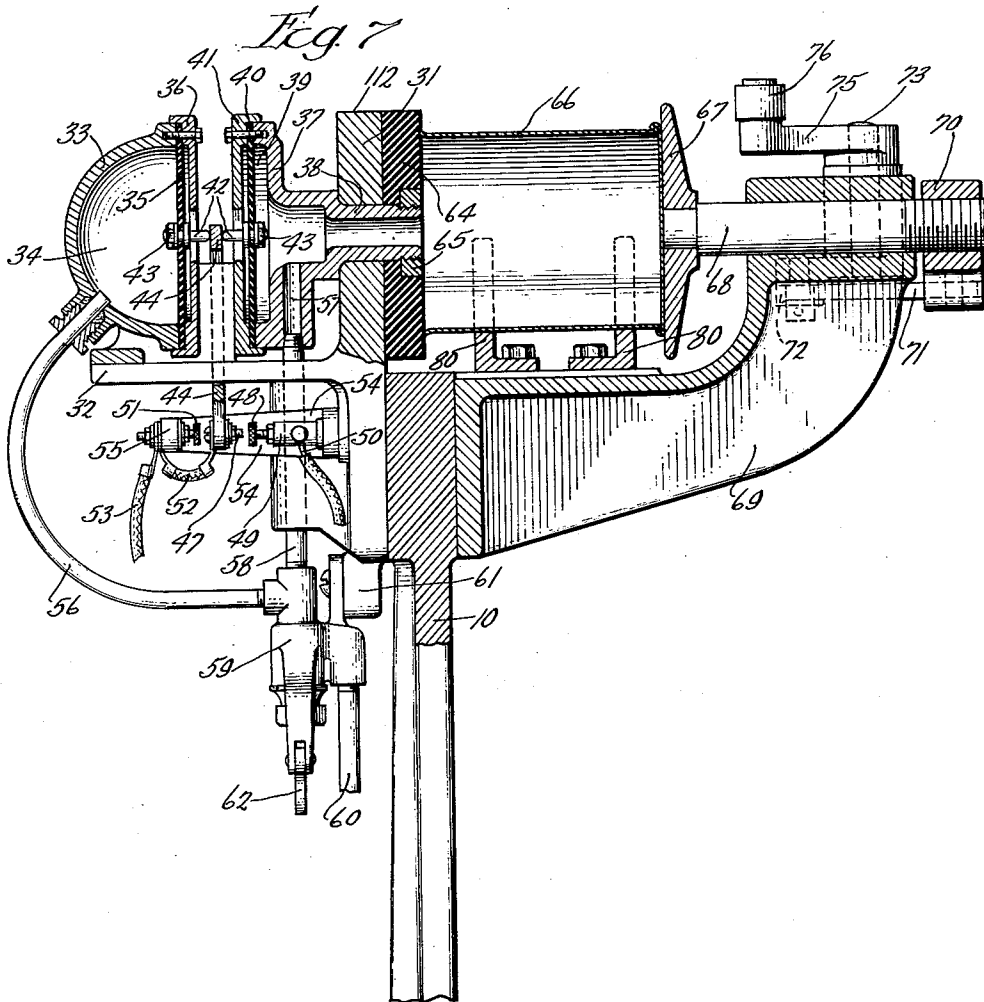
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CAN TESTER

Filed May 2, 1927

8 Sheets-Sheet 7



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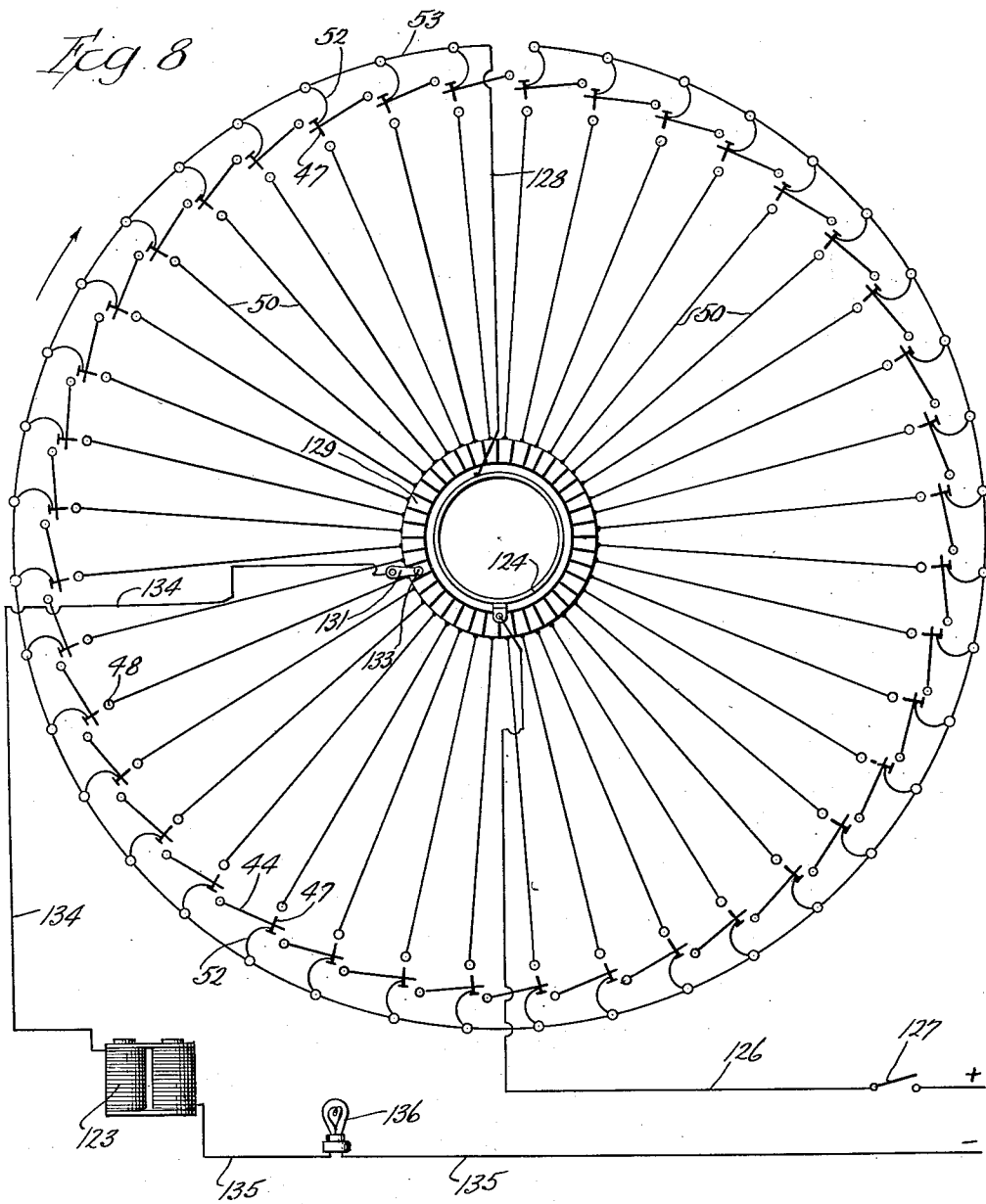
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CAN TESTER

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8 Sheets-Sheet 8



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UNITED STATES PATENT OFFICE

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CAN TESTER

Application filed May 2, 1927. Serial No. 188,142.

This invention relates in general to an individual can tester in which the balanced diaphragm principle is employed to locate and automatically reject leaky cans.

5 The principal object of the invention is the provision of an improved automatic mechanism of this kind for applying fluid pressure separately to each can testing head and by the operation of a sensitive diaphragm to close an electric circuit which will actuate means for rejecting a leaky can.

10 A further object of the invention is the provision of a diaphragm of which the movement is magnified to close an electric circuit for controlling the selection of cans, and also the protection of the diaphragms against violent fluctuations.

15 A further important object of the invention is to provide a balanced diaphragm head controlled by a single valve, which eliminates the ground disks previously employed in air pressure testers.

20 Another important object of the invention is the provision of improved electrically controlled means for rejecting leaky cans.

25 A still further object of the invention is the provision of a balanced diaphragm head with means for controlling the valve therefor to prevent operation of the valve if there is no can in testing position on the head.

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

In the drawings:

35 Figure 1 is a view in elevation of a tester constructed in accordance with the principles of this invention;

40 Fig. 2 is a partial side elevation taken on the line 2—2 of Figure 1;

Fig. 3 is a section taken on the line 3—3 of Fig. 1;

45 Fig. 4 is an enlarged detail view, partly in section, taken on the line 4—4 of Fig. 3;

Fig. 5 is a partial section taken on the line 5—5 of Fig. 2 showing the no-can-no-air operating mechanism;

50 Fig. 6 is a partial section taken on the line

6—6 of Fig. 2 showing the can selecting means;

Fig. 7 is a section of one of the testing heads taken on the line 7—7 of Fig. 1; and

Fig. 8 is a wiring diagram of the electrical 55 controlling contacts and connections.

Each testing head of this machine comprises a balanced diaphragm entirely separate and distinct from each of the other heads, so that in testing a can each testing head might receive a slightly different pressure and still be subjected to the same sensitive test. A multiplying lever transmits any slight variation of pressure in the chambers of each head so that even a small leak in a can produces a movement of the lever sufficient to close an electrical connection at the proper time and to withdraw a leaky can automatically from a batch of good ones without interrupting the operation of the machine, and at the same time to give a visible signal that a leaky can has been withdrawn.

Referring now more particularly to the drawings; a tester wheel 10 is mounted for rotation upon a hollow shaft 11 journaled 75 at its ends in bearing posts 12 and 13, which in turn are secured to a suitable base 14.

Also secured to the hollow shaft is a pressure head 15 with passages 16 communicating therefrom to the interior of the hollow shaft which receives pressure from any suitable exterior source through a pipe 17 extending through a packing gland 18 at one end of the shaft 11, the other end of the shaft being closed by a removable plug 19.

80 A commutator 20 is also secured to the hollow shaft 11 and is preferably disposed between the pressure distributing head 15 and the bearing post 13.

In order to rotate the tester wheel a bevel gear 21 (see Fig. 3) is secured to the shaft 11 and meshes with a pinion 22 secured to a vertical shaft 23 which is mounted in bearings 24 extending from the bearing post 12. Between the bearings 24 a worm gear 25 is secured to the shaft 23 and meshes with a worm gear pinion 26 carried on a driving shaft 27. This driving shaft is adapted to receive power from a driving pulley 28 which is loosely mounted upon shaft 27 but is con- 100

nected thereto by means of a clutch mechanism 29 operated by a lever 30.

At the periphery of the tester wheel 10 are a plurality of individual can testing heads, as shown more clearly in Fig. 7. Each head comprises a plate 31 projecting beyond the periphery of the wheel 10 with a laterally extending arm or shelf 32 upon which is carried a hollow shell 33 forming a chamber 34, the face of which is closed by a diaphragm 35 held in place around the edges by a clamping ring 36. Opposite this shell 33 is a hollow tubular member 37 with a stem 38 inserted through the projecting end plate 31 and with a recessed end 39 of substantially the same diameter as the interior of the shell 33, so that a diaphragm 40 of the same size as the diaphragm 35 is held in place over the end of the tubular member 37 by means of a clamping ring 41. At the centers of the diaphragms 35 and 40 are bearing studs 42 adjusted by nuts 43 and spaced apart to receive a lever 44 closely therebetween, the outer ends of the studs 42 being preferably rounded and engaging the opposite sides of the lever 44. The lever is mounted at its outer end on pivots 45 (see also Figs. 3 and 4) extending through lugs 46 projecting from one of the clamping rings as 41, the lower end of the lever 44 being free to oscillate or move and the contact of the studs 42 therewith being sufficiently close to the bearing pivots 45 to permit considerable magnifying of any slight movement imparted to the lever, at the free end thereof.

The lower end of each lever 44 is therefore oscillated correspondingly by movements of the diaphragms 35 and 40 and at its lower end it carries a contact 47 adapted to make electrical connection with an adjustable screw contact 48 which is carried by a fixed binding post 49, to which is connected an electrical conductor 50. At the other side of the lever 44 is an adjustable contact screw 51 threaded through an extending head 55 of a fixed bracket 54 and adapted to engage the lever for limiting its movement in this direction so that if the shell 33 of the testing head should have any leakage the lever 44 would not be moved too far in the outer direction which would tend to weaken or strain the opposite diaphragm 40. Thus the stops 48 and 51 offer an easily adjusted means of limiting the lateral movement of the lever 44.

Connected to the lower end of the lever 44 and to the contact 47 is a short electrical conductor 52 which is secured at its outer end to the stem of the contact screw 51 where a conductor 53 is also secured, which leads to the contact screw 51 of the next adjacent testing head, thus electrically connecting all of the contacts 47 carried by the levers 44. Both contact members 51 and 48 are preferably mounted in the bracket 54 which is secured to the plate 31 below the arm 32, the outer end

55 of the bracket overhanging or extending around the free end of the arm 44, and the bracket 54 for each testing head is mounted at the side of the adjacent plate 31 to the left of the head (see Fig. 4) to which the lever 44 is pivoted. The object of this construction is to provide a lever 44 with an operating arm of considerable length so that a slight variation of pressure in the diaphragms may be greatly magnified, thereby producing a very sensitive operating and circuit closing mechanism.

Communicating with the interior of the shell 33 is a pipe 56, and communicating with a passage 57 extending to the interior of the tubular member 37 is a pipe 58. These pipes 56 and 58 extend into one end of the body of a valve 59 which controls the supply of pressure thereto from a pipe 60 which leads from the pressure distributing head 15. The valve is secured by a suitable fastening device to a lug 61 projecting from the plate 31 to which it relates, and each valve has a pivoted operating lever 62 for engaging a spring-pressed valve stem 63. Pressing inwardly on the valve stem opens the valve to admit pressure from the pipe 60 through the pipes 56 and 58 to the chambers for the diaphragms 35 and 40.

At the inner end of the tubular stem 38 (see Fig. 7) a flexible packing or sealing member 64, made of rubber or the like, is held in place by means of a nut 65, and this packing forms a seat upon which the open end of a can 66 or other receptacle to be tested is pressed for making a fluid tight joint. Each can is held in place by a pressure plate 67 secured at the end of a shaft 68 mounted for longitudinal movement in a bracket 69 secured to the periphery of the wheel 10 opposite a plate 31. This shaft 68 is moved longitudinally by means of a collar 70 adjustable upon the threaded outer end of the shaft and connected by means of a link 71 with a lower crank member 72 (see Figs. 2, 3 and 7) which is connected by means of a short shaft 73 extending through a bearing lug 74 of bracket 69 with an upper crank arm 75 which carries an anti-friction roller 76 at its free end.

It is apparent that the movement of the crank arm 75 will produce a corresponding movement of the lower crank arm 72 and a corresponding longitudinal movement of the shaft 68.

The cans to be tested are admitted through a chute 77 (see Figs. 1 and 2) at one side of the machine, are clamped in position in the successive testing heads and are discharged from the machine after almost a complete rotation of the wheel, either as perfect or imperfect cans. In order to automatically clamp the cans in position, the successive crank arms 75 are engaged by a channel cam 78 (see Fig. 2) which receives the anti-friction roller 76 when each shaft 68 is in its

outermost position, and as the wheel 10 is rotated each crank arm 75 is moved inwardly carrying its shaft 68 and applying the pressure head 67 to press a can 66 upon the resilient seat 64. The parts are so proportioned that when the shaft 68 is moved inwardly in this manner the link 71 is moved by the crank arm 75 so that it passes the center line of the crank arm, thereby holding the shaft and the pressure head 67 in place after the crank arm 75 emerges from the end of the channel cam 68. It is only when the movement of the tested can around the wheel 10 is substantially complete that the pressure head is released by means of another channel cam 79, substantially the reverse of channel cam 78 which is adapted to engage the anti-friction rollers 76 in their innermost position, as shown at the bottom of Fig. 2, and to move the crank arm 75 outwardly as the wheel rotates, the rearward movement of this end of the arm 75 moving its link 71 past the center line of rotation of the crank arm 75 and withdrawing the shaft 68 and the clamping head 67. The tested cans are then discharged as explained hereafter.

In order to position the cans to be tested, each of the testing heads has a pair of semi-circular yokes 80 secured to the bracket 69 to substantially center the can 66 with respect to the resilient packing 64 and with respect to the pressure plate 67. As shown more clearly in Fig. 5, the cans to be tested are applied to the periphery of the testing wheel 10 by means of the inclined feeding chute 77 and the lowermost can in the chute is pressed into engagement with the yokes 80 upon each successive head, the engaged can being carried by the yokes and prevented from disengagement therewith by the pressure of the cans above it and by engagement with a plate 81 supported from the machine frame by a cross piece 82, the clamping means engaging the can upon the head at the time the cans to be tested are held in place by this plate 81, as clearly evidenced from the location of parts as shown in Fig. 2.

As soon as each can to be tested is clamped in place upon its respective head, it is desirable to apply pressure to the closed sides of the diaphragms 35 and 40 and to the can 66 which is pressed tightly against its seat 64. This is done by operating the pressure valve 59 corresponding to that head, a momentary opening of the valve being sufficient to admit fluid under equal pressure both to the chamber 34 and to the chamber formed by the can in communication with the interior of the tubular member 37. The operation of these valves 59 is effected by means of an arm 83 pivoted on a standard 84 attached to a portion of machine frame 85, the arm having a cam surface 86 which may be moved into or out of position to engage the rounded extremity of each valve operating lever 62 as it passes. The cam arm 83 is moved into engaging position by means of a cam 87 pivoted on the standard 84 and adapted to engage the face of the arm 83 opposite the cam surface 86 to move the cam face into the path of the lever 62, the cam 87 being oppositely engaged by an arm 88 attached to a shaft 89 on which the cam 87 is secured and connected by means of a rod 90 which extends beyond the path of movement of the wheel 10 and is connected at its other end to an arm 91 secured to a cross shaft 92 mounted in brackets 93 on the cross piece 82. At the other end of this shaft 92 is secured an arm 94 with an anti-friction contact roller 95 at its free end adapted to extend into the path of and to contact with cans carried by the pressure heads as the testing wheel is rotated. If it should happen that there is no can to be tested in any one of the pressure heads, the operating arm 94 is not moved and consequently the cam arm 83 is not moved but remains, as shown in Fig. 5, out of the path where it will engage the extremities of the valve lever 62. However, the engagement of the arm 94 by any can carried by a testing head will cause the arm 94 to be rocked outwardly into the broken line position indicated in this figure, thereby correspondingly rotating the arm 91 and the connected mechanism to actuate the cam arm 83 into the broken line position where it will be in the path of the valve lever 62 and will actuate them in succession as they pass, thereby applying pressure equally to both of the closed sides of the diaphragms 35 and 40 and to the can upon the testing seat.

After the cans receive the pressure applied to the balanced diaphragms of the testing heads, they are carried substantially a complete rotation of the testing wheel 10 in order to afford sufficient time for even a minute leak to develop sufficient difference in pressure to operate the contact arms 44. The cans are discharged into a chute 96 (see Figs. 1 and 6) which has upper discharging rails 97 and a bottom compartment 98 separated from the path formed by the rails 97 by a pivoted gate 99. In one position, as shown in Fig. 6, this gate forms a continuation of the rails 97 extending adjacent the periphery of the testing wheel, so that cans discharged therefrom will roll by gravity on top of the gate 99 and down the discharge rails 97. In its other or raised position, as shown in Fig. 1, this gate will deflect a can from its passage down the rails 97 to the chamber 98 below them.

The cans carried by the testing wheel are released from the clamping engagement just prior to the time they reach the upper end of the discharge chute 96 by the operation of the channel cam 79 engaging the operating arms 75 for positively moving the clamping plate shafts 68, as previously explained, and a plate 100 is mounted upon a bracket 101 supported

on a cross piece 102 of the machine frame 85 so that the cans as released from the clamping head may engage this contact plate 100 but will be carried by the yokes 80 to the upper edge of the plate 100 which is flush with the upper face of the gate 99. A baffle plate 103 is attached to the upper side of the chute 96 to prevent the cans from being carried past the chute. Thus it will be seen that the cans are released in succession and are carried in contact with the plate 100 until they reach the opening for the chute 96, whereupon they will fall by gravity into the chute and will roll upon the rails 97 or will fall into the chamber 98, depending upon the position of the gate 99.

The gate 99 is mounted upon a shaft 104 pivoted at its ends in the seats of the chute 96 and having an arm 105 at one end connected by means of a rod 106 with an arm 107 freely pivoted on a shaft 108 which is mounted adjacent the periphery of the testing wheel in a standard 109 attached to the machine base 14. Attached to the shaft 108 is a cam arm 110 which carries an anti-friction roller 111 at its outer end adapted to contact with a cam surface 112 formed by the outer edge of the plates 31 which are attached at the periphery of the testing wheel 10 for mounting the testing heads thereon. This cam surface 112 causes a rocking movement of the arm 110 for each of the testing heads. Also attached to the shaft 108, so that it will be rocked with the arm 110, is an operating member 113 having a shoulder 114. Pivoted on the arm 107 is a pawl or dog 115 adapted to engage the shoulder 114 and to cause a corresponding rocking movement of the arm 107, and consequently of the connected gate 99. This pawl 115 is operated by an arm 116 secured to the same shaft 117 as that to which the pawl 115 is attached, the arm 116 being connected by means of a rod or link 118 with the extremity of a lever 119 pivoted intermediate its ends upon a standard 120 and having a spring 121 tending to hold it so that the pawl 115 is out of position to engage the shoulder 114. This lever carries an armature 122 for an electromagnet 123 which is energized to attract its armature, thereby operating the lever 119 to move the pawl 115 in such a position that the next rocking movement of the arm 110 and its operating member 113 will cause a rocking movement of the arm 107 and the movement of the gate 99. This rocking movement of the gate will open the discharge chamber 98 of the chute 96 so that a can discharged by the testing wheel will fall into the chamber 98 rather than down the rails 97.

The magnet 123 is energized whenever there is a can leak at any testing head sufficient to cause a movement of its contact lever 44, assuming of course that the other operating parts are pressure tight. The electrical

connections comprise a contact ring 124 which is connected with a suitable source of power by means of a spring-pressed contact brush 125 attached to one of the bearing standards 13 and by a conductor 126 attached to the brush and controlling the current by a switch 127. As previously explained, the contacts at the extremities of the levers 44 are connected together by the short conductors 52 and other conductors 53, so that another conductor 128 connected to the contact ring 124 connects all of the lever contacts 47 together and to the contact ring 124. The commutator 20 has a number of segments 129, one corresponding to each of the pressure heads and each pressure head being connected to a corresponding segment 129 by means of its conductor 50 which extends from the fixed binding post 49 which carries the adjustable contact 48 and makes a fixed connection with its proper commutator segment 129. Mounted on the machine frame 85 (see Fig. 4) is a slotted bracket 130 in which one end of a brush holding link 131 is adjustably secured by a fastening means 132, the other end carrying a contact brush 133 to which is connected a conductor 134 which extends to a magnet 123. From the magnet (see Fig. 8) a conductor 135 extends to a lamp or other signalling device, and thence to the source of current supply. Thus it is apparent that a circuit is closed through the magnet 123 whenever any one of the contact levers 44 is moved by a lack of pressure in the can chamber of the testing head, the circuit being traced from the positive source of supply through switch 127, conductor 126, and contact brush 125 to contact ring 24, thence through conductor 128, conductors 53 and 52 with all of the contacts 47 of the contact levers 44 and through the connection made by any contact lever with its corresponding fixed contact 48, thence by conductor 50 to the corresponding commutator segment 129 and through contact brush 133 and conductor 134 to the magnet 123, thence through contact 135 and signal device 136 to the other side of the line. It will be seen that the contact is made for energizing magnet 123 only while the commutator segment is under the brush 133, but this is in timed relation to the operation of the cam arm 110 and the selecting gate 99, so that the operation of any lever 44 will cause the magnet 123 to be energized and the gate 99 to be raised to discharge the can from that testing head not into the ordinary path in the discharge chute 96 but into the leaky can chamber 98. If there are a succession of leaky cans they will all be discharged into the leaky can chamber 98, the magnet 123 will be energized for each leaky can, and the gate 99 will be correspondingly operated for each leaky can. Each time the magnet is energized, the signal 136 will be correspondingly actuated to give

visual notice, if it is a lamp, or audible notice if it is a bell or buzzer, that a leaky can has been discharged.

This mechanism operates continuously and is self-setting, requiring no manual attention except to start and stop it. The cans to be tested are fed continuously in the chute 77, the rotation of the testing wheel 10 picks up the lowermost can successively in the separate testing heads as they pass the chute and the cans are automatically centered and clamped in place upon the testing heads. If it happens that there is no can in the testing head, pressure will not be applied thereto but each can filled head will receive equal pressure applied to spaced diaphragms between which is a sensitively operated contact lever. The pressure is shut off for each head and the can to be tested is carried almost one complete rotation of the testing wheel, so that if a leak develops in that time the difference in pressure of the two spaced diaphragms gives a movement to the contact lever which closes an electrical connection for energizing the magnet. This magnet in combination with a cam device operates a selective discharge receiver for the tested cans which selects the leaky cans and discharges them in a different place than those in which no leak was shown. It is believed that no further statement of operation is necessary as each separate operation is described in detail.

It is thought that the invention and many of its attendant advantages will be understood from the foregoing description, and it will be apparent that many 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 form hereinbefore described being merely a preferred embodiment thereof.

I claim:

1. In a can tester, a movable carrier having a plurality of separate can testing heads, each head comprising a double diaphragm testing device, means for admitting the same pressure against both diaphragms, and means for applying a can to be tested in communication with one diaphragm to receive the same pressure.

2. In a can tester, a rotatable testing wheel, a plurality of independent testing heads, each comprising a double diaphragm testing device, means for applying a can to be tested to receive the pressure of one of the diaphragms, and operating means disposed between the diaphragms actuated by a difference in pressure upon the diaphragms.

3. In a double diaphragm can tester, a pair of spaced diaphragms, means forming a pressure reservoir in connection with each diaphragm, means for applying the same pressure in separate reservoirs communicating with the diaphragms, means for connecting

a can to be tested to receive the pressure applied to one of the diaphragms, an operating lever mounted between the diaphragms, and means in connection with the diaphragms to engage the lever and impart thereto a movement depending upon the difference in pressure applied to the diaphragms.

4. In a double diaphragm can tester, a pair of spaced diaphragms, means forming a pressure reservoir in connection with each diaphragm, means for applying a can to be tested to receive the pressure of one of the chambers, means for applying the same pressure to the diaphragm chambers and cutting off the pressure after thus applied, an operating lever disposed between the diaphragm, and means in connection with the diaphragms to engage the lever for actuating it in one direction or the other depending upon a change in pressure applied to the diaphragms.

5. In a double diaphragm can tester, a pair of spaced diaphragms, means forming pressure receptacles on the opposite sides of the diaphragms, clamping means for holding the can to be tested in communication with one of the pressure chambers, a pivoted operating lever mounted between the diaphragms, means connected to the diaphragms for engaging the lever therebetween and a valve for admitting the same pressure to the receptacles and cutting off the pressure thus applied, the difference in pressure in the receptacles causing the diaphragms to actuate the lever by moving it laterally.

6. In a can tester, a rotatable carrier having a plurality of testing heads at its periphery, each head comprising a pair of spaced testing receptacles with parallel diaphragms, means for connecting a can to be tested to one of the receptacles, a fluid pressure head at the hub of the carrier, a single valve and fluid pressure connections between the pressure head and each of the receptacles operated by the valve, and means between the diaphragms actuated by a difference in pressure in the receptacles after the fluid pressure from the head has been cut off from the receptacles.

7. In a can tester, a rotatable carrier having a plurality of double diaphragm can testing heads at its periphery, means forming a pair of opposite closed chambers, one of which communicates with a can to be tested, a hollow shaft upon which the carrier is mounted, means forming a fluid tight pressure connection with the interior of the shaft, a fluid pressure head surrounding the shaft and communicating with the interior thereof, and means connecting the pressure head with each of the receptacles, said means including a valve for controlling the admission of the same pressure to the opposite receptacles of each head.

8. In a can tester, a movable carrier hav-

ing a plurality of can testing heads, each head comprising a pair of spaced pressure receptacles and a pair of opposed diaphragms closing the same, means including a valve for admitting the same pressure to the receptacles of each head, and a valve operating cam movable to actuate the valves.

9. In a can tester, a rotatable carrier, a plurality of testing heads at the periphery of the carrier, each head comprising a fluid pressure tester, means for applying a can to be tested to the fluid pressure tester, means including a valve for admitting fluid under pressure to the can to be tested, an operating device for engaging each valve to admit the fluid under pressure, and an arm engageable by the side of a can in connection with the device to prevent its operation when a can to be tested is not carried by the testing head.

10. A rotatable can tester, comprising a plurality of can testing heads, a fluid pressure testing device on each head, means for applying a can to be tested to each of the testing heads, a fluid pressure valve for each testing head, a movable cam for engaging the valve to admit fluid under pressure through the valve to the testing device when a can is carried by the head, and means for controlling the valve operating cam to move it out of position to engage the valve when a can to be tested is omitted from that particular head.

11. In a can tester, a rotatable carrier, a plurality of testing heads at the periphery thereof, each head comprising a valve controlled fluid pressure device, means for connecting a can to be tested to the fluid pressure device, a valve operating means for selectively admitting fluid under pressure to the device, said valve operating means comprising a cam for operatively engaging the valves of the devices in succession, a controlling arm extending into the path of the cans carried by the heads and a connection from the arm to the cam for moving it into the path of each valve only when a can to be tested is carried by that particular head.

12. In a can tester, a rotatable carrier, a plurality of can testing heads at the periphery of the carrier, each head comprising a valve controlled fluid pressure device, means for attaching a can to be tested to each fluid pressure device, means for operating the valve for each head only when a can is carried thereby, said means including a member disposed in the path of cans carried by the head, an operating device for engaging the valves for the respective heads, and means connecting the operating member and the said valve operating device.

13. In a can tester, a movable carrier having a plurality of can testing heads, means for feeding cans to be tested one at a time to said heads, a fixed plate spaced opposite

the heads for retaining the cans in place thereon as the carrier is moved, and can clamping mechanism mounted on said carrier for engaging the cans on the heads before the carrier moves such cans past the said plate.

14. In a can tester, a movable carrier having a plurality of testing heads, fluid pressure means in connection with each head, a can feeding chute for applying cans to the heads, means on each head for centering the can thereon, a clamping device for each head comprising a projecting operating arm, and a pair of cams having their throws in the direction of the axis of the carrier, one to engage the arm for operating the clamping device when a can is centered upon the head and the other cam engaging the arm to release the clamping head for discharging the can.

15. In a can tester, the combination with a rotary carrier having a plurality of can receiving heads, of means for feeding cans to be tested to said heads, an electrical contact maker for each head dependent for operation upon the can tester, a discharge chute for the cans having a separate chamber for leaky cans, a movable gate independent of the carrier and arranged at the lower side of the same for controlling the admission of cans to said chamber, an operating device for the gate, and means dependent upon the actuation of the contact maker to cause the operation of the gate by said device when the can from that particular head is discharged from the carrier.

16. In a can tester, a movable carrier with a plurality of can testing heads, each head comprising a pair of spaced diaphragms, a contact lever pivoted between and adjacent the central part of the diaphragms, means extending from the diaphragms to engage opposite sides of the lever, an adjustable electrical contacting means in connection with the free end of the lever, and selective means including an electro-responsive device controlled by the contact lever to discharge the cans from the testing heads in predetermined places, depending upon whether the contact lever of each head is actuated by the testing device.

17. In a can tester, a rotatable carrier, a plurality of pneumatic testing devices mounted on the carrier, a contact lever actuated by each of the devices to close an electrical connection when a leaky can is detected by the testing device, a chute for receiving cans discharged from the carrier, a gate independent of the carrier and located in the chute for diverting leaky cans from the ordinary path in said chute, means for operating the gate, and an electro-responsive device which receives current when the contact lever of any head is actuated by the pneumatic de-

vice thereof to actuate said operating means to open the gate.

18. In a can tester, a movable carrier, a plurality of can testing heads mounted on the carrier, a leaky can detector including a movable contact maker in connection with each head, a discharging chute for all of the cans from the tester, a gate movable in the chute for diverting leaky cans from those discharged in the chute, means for operating the gate comprising a cam surface formed by the testing heads, an arm rocked by the cam surface of each head, a shouldered operating member movable with the arm, a gate operating arm mounted adjacent the shouldered operating member, a pawl carried by the gate operating arm, and an electro-responsive device for operating the pawl to engage the shoulder of the operating member to open the gate when a contact member of the testing head is actuated by a leaky can.

19. In combination with a rotatable carrier of a plurality of testing heads mounted thereon, a leaky can detector in each head including a movable contact arm, means moving a cam surface for each contact head, a discharge chute for cans, a leaky can deflecting gate in the chute, cam operated means engaging the cam surface of said heads for controlling the gate, and an electro-responsive means for selectively operating the gate operating means only when the said contact lever has been actuated by the leaky can detector of one of the heads.

20. In a can tester, a rotatable carrier, a plurality of can testing heads including a can centering device on each head, means for feeding cans to the heads including a can feeding chute extending adjacent the periphery of the carrier, so that the lowermost can is picked up by the centering device, a plate at the periphery of the carrier extending above the feeding chute for holding the cans in place, a discharge chute for tested cans on the same side of the carrier below the can feeding chute, a plate opposite the periphery of the carrier for engaging the cans just prior to their deposit in the discharging chute, clamping means in connection with each can testing head, and means for operating each of the clamping means to engage the can before it reaches the first mentioned plate and after it reaches the second mentioned plate.

21. In a can tester, a movable carrier having a plurality of testing heads, means for feeding cans in succession to the heads and clamping them in position thereon, a fluid pressure testing device for each head and an electrical contact arm actuated thereby, a can discharge chute, means for releasing the cans into the discharge chute, a cam operated gate in the chute for deflecting leaky cans, an electro-magnetic device for controlling the operation of the gate and an electrical commu-

tor device movable with the carrier for timing an electrical impulse received from the contact lever of a testing head to actuate the electro-magnetic device.

22. In a can tester, a testing head including a contact lever actuated by the presence of a leaky can in the testing head to close an electrical circuit connection, selective discharge means for diverting leaky cans, said means including an electrical actuating device, a commutator having segments corresponding to the contact levers of each head, and means for forming a timed electrical connection with the commutator to energize the electro-responsive device for actuating the can selecting means only when a leaky can is detected by one of the heads.

23. In a can tester, a plurality of testing heads, an electrical contact lever for each head, means forming a continuous electrical connection with all of the contact levers, a commutator movable with the testing heads and comprising a fixed connection with one of the contact segments for each of the heads adapted to be electrically connected by the movement of its contact arm, can selecting means including an electro-magnetic actuating device and adjustable contact means engageable with the commutator for closing a circuit to the electro-responsive device for selecting a can depending upon the actuation of the said contact lever.

24. In a can tester, a pneumatic testing head comprising a pair of opposite spaced diaphragms and means forming pneumatic chambers therefor, a contact lever disposed between the diaphragms and pivoted at one end near the center of the diaphragms, contact means extending from the diaphragms to engage the lever on opposite sides thereof adjacent its pivotal support, a pair of spaced contacts for engaging the free end of the contact lever, one of the contacts forming a limit stop for actuation of the lever in one direction, and the other contact forming a limit stop and also being adapted to close an electrical connection with the contact arm.

25. In a can tester, a rotatable carrier, a plurality of pneumatic testing heads mounted thereon, means for clamping the can to be tested upon each head, a device depending upon the presence of a can in each head for admitting pressure thereto, an electrical contact member actuated by the testing head when a leaky can is carried thereby, a discharge chute for tested cans, a leaky can diverting gate in the chute, and means for actuating the gate comprising an electro-magnetic device, circuit closing means for the magnetic device including a commutator having an electrical connection for each contact lever, so that the magnet is energized at a time to operate the gate when a leaky can reaches the discharge chute.

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