

Feb. 7, 1956

R. W. LE MIEUX

2,733,464

BALL CLEANING AND POLISHING APPARATUS

Filed Dec. 18, 1950

5 Sheets-Sheet 1

Fig. 1.

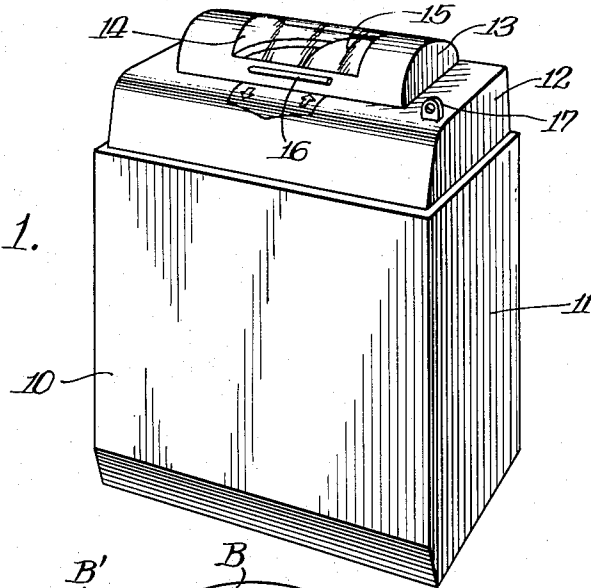
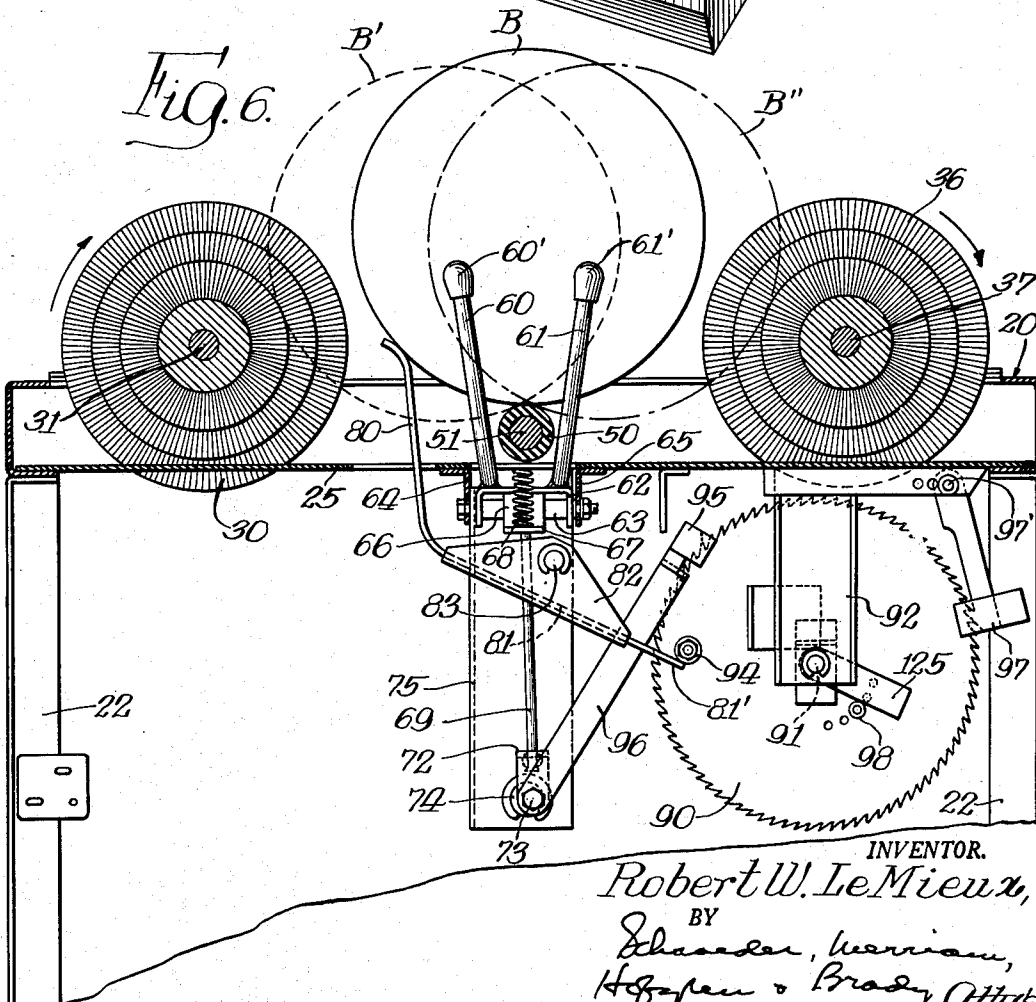


Fig. 6.



INVENTOR.

Robert W. LeMieux,

BY

Schaefer, Merriam,
Hogpen & Brady Attys.

Feb. 7, 1956

R. W. LE MIEUX

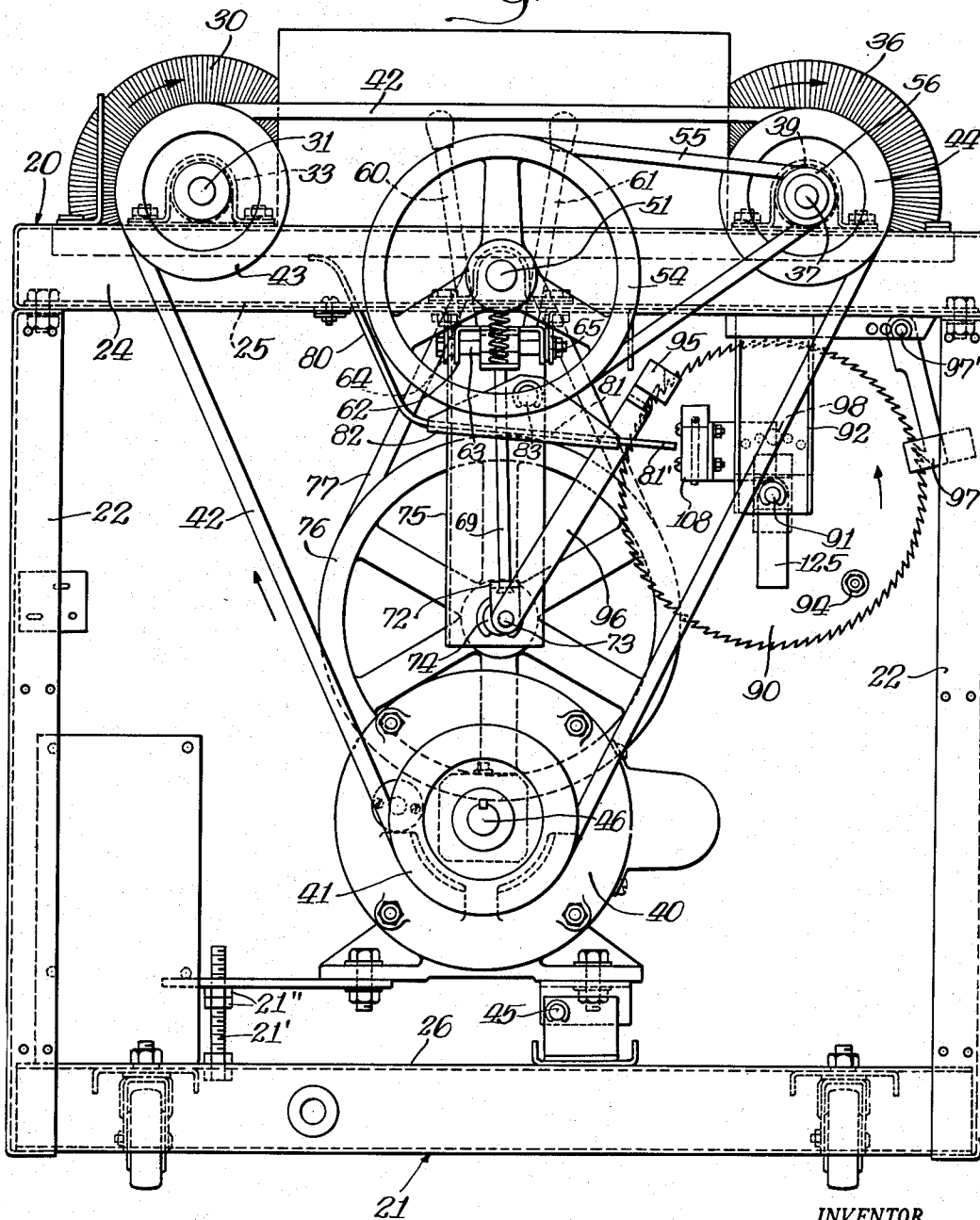
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Fig. 2.



INVENTOR.
Robert W. Le Mieux,
BY
Schroeder, Kervian,
Hogben & Brady Attys.

Feb. 7, 1956

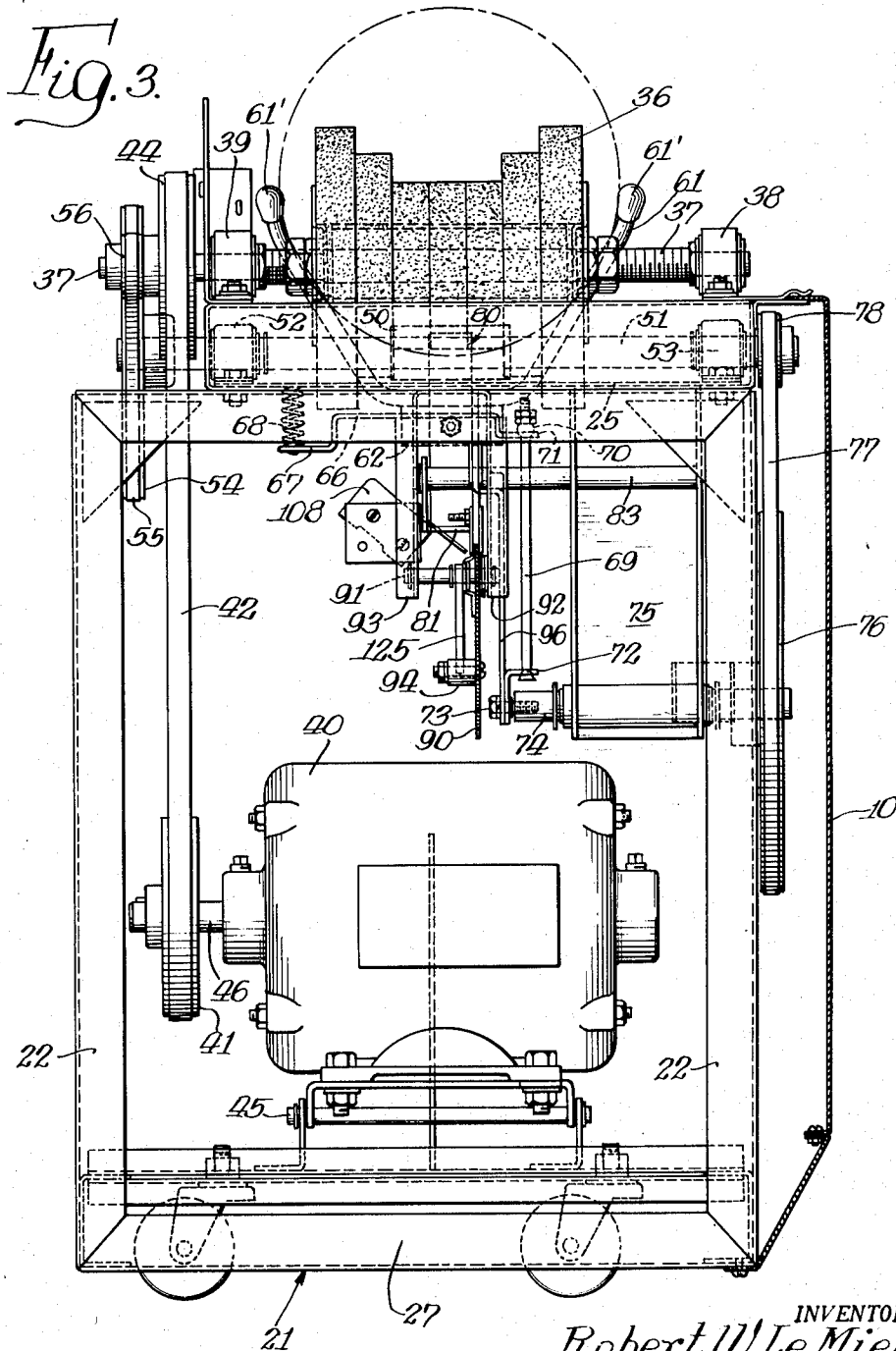
R. W. LE MIEUX

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BALL CLEANING AND POLISHING APPARATUS

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INVENTOR.
Robert W. LeMieux,
BY
Schroeder, Newman,
Hagopian & Brady Attys.

Feb. 7, 1956

R. W. LE MIEUX

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BALL CLEANING AND POLISHING APPARATUS

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Fig. 4.

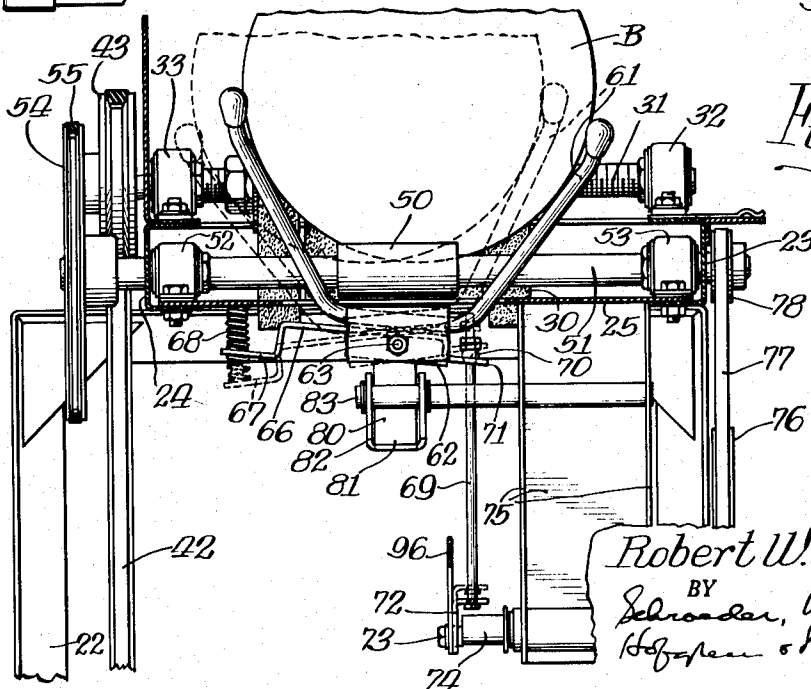
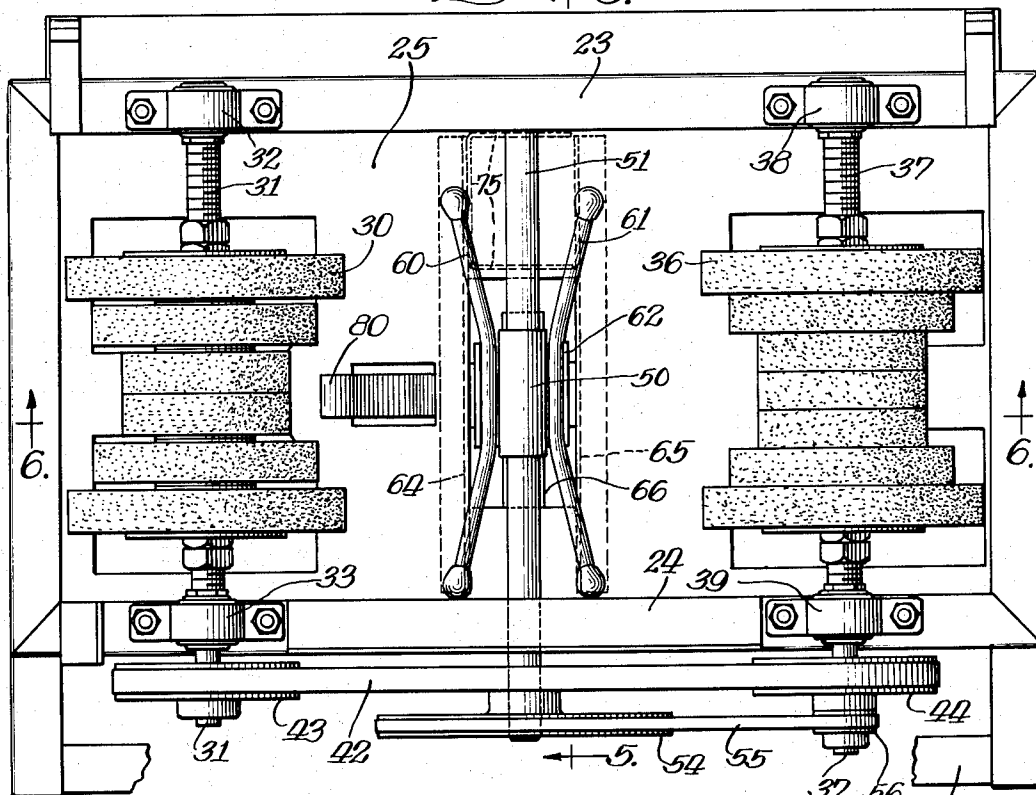


Fig. 5.

INVENTOR.
Robert W. LeMieux,
BY
Schroeder, Kervian,
Hofmann & Mader, Attys.

Feb. 7, 1956

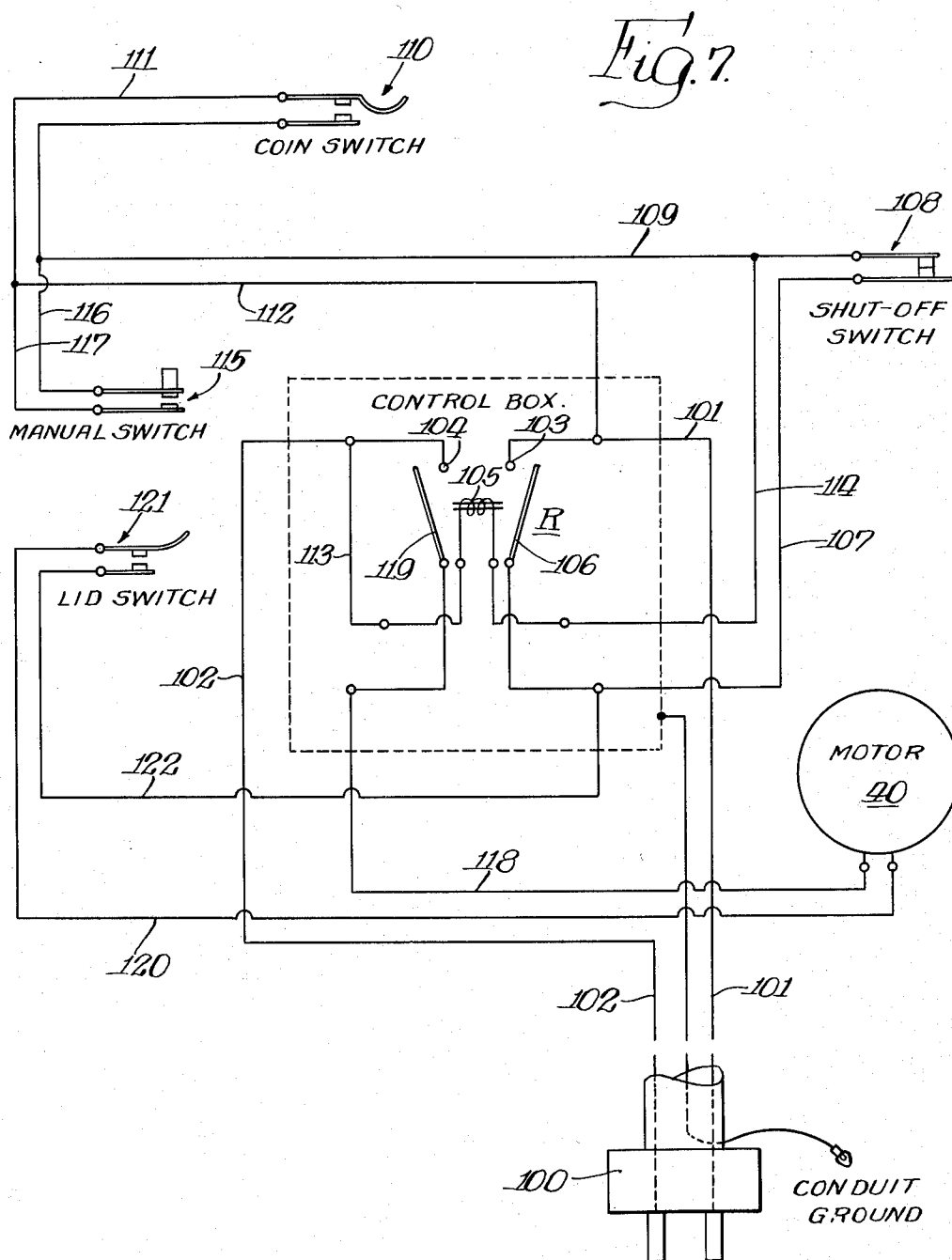
R. W. LE MIEUX

2,733,464

BALL CLEANING AND POLISHING APPARATUS

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5 Sheets-Sheet 5



INVENTOR.

Robert W. LeMieux,

BY

*Schander, Kervian,
Hogben & Brady Attys*

1

2,733,464

BALL CLEANING AND POLISHING APPARATUS

Robert W. Le Mieux, Fruitport, Mich., assignor to The Brunswick-Balke-Collender Company, a corporation of Delaware

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15 Claims. (Cl. 15—21)

More particularly the invention relates to such an apparatus adapted for cleaning and polishing bowling balls and the like, and other spherical objects with relatively large diameters.

It is the general object of the invention to provide a new and improved apparatus for automatically cleaning and polishing balls wherein the entire surface of the ball is treated without requiring manual manipulation of the ball during the operation of the apparatus.

Another object is to provide a cleaning and polishing machine having a rotating cleaning member and a rotating polishing member together with new and improved means for supporting a ball and effecting contact of the ball first with the cleaning member and then with the polishing member.

Another object is to provide such a machine adapted for cleaning and polishing a bowling ball without the use of a detergent or other cleaning material.

Other objects and advantages of the invention will become readily apparent from the following detailed description taken from the accompanying drawings in which:

Fig. 1 is a perspective view of a bowling ball cleaning and polishing machine embodying the preferred form of the invention;

Fig. 2 is an enlarged elevational rear view of the machine with the cover or casing removed;

Fig. 3 is a similar side elevational view looking at the right hand end of Fig. 2;

Fig. 4 is a top plan view of Fig. 2;

Fig. 5 is a fragmentary vertical section along line 5—5 of Fig. 4;

Fig. 6 is a fragmentary vertical section along line 6—6 of Fig. 4; and

Fig. 7 is a wiring diagram.

While there is shown in the drawings and herein described in detail a preferred embodiment of the invention, it is contemplated that various changes may be made by those skilled in the art without departing from the spirit and scope of the invention as set out in the appended claims.

As shown in Fig. 1, the preferred form of the invention has a casing consisting of a front panel 10, side panels 11, a top member 12 and a hinged lid 13. The lid has an opening 14 preferably covered by glass or other transparent material so that during operation of the machine a ball 15 therein may be observed through the window of the lid. A handle 16 enables a bowler to raise the lid for the purpose of removing or inserting a ball. It is contemplated that the machine will be provided with a manual starting switch or that, alternatively, it will be provided with a coin slot device 17, as described more fully hereinafter in connection with the wiring diagram of Fig. 7.

In Figs. 2 to 6 the machine is illustrated with the side panels and the back of the casing removed and also without the top 12 and the lid, in order more clearly to

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show the operating mechanism. This mechanism is supported on a frame made up of angles and channels having a rectangular top 20, a rectangular bottom 21 and corner posts 22. The top has a cover plate 25, and cross members 23 and 24 extending above the plate 25. The bottom of the frame has front and rear members 26 and side members 27.

A ball cleaning means is shown in the form of a wire buffer or brush wheel 30 carried on a shaft 31 which is rotatably supported in bearing blocks 32 and 33 carried respectively on the members 23 and 24. A ball polishing means is also in the form of a brush or buffer wheel 36, positioned in laterally spaced and parallel relation to the cleaning wheel on a shaft 37 rotatably supported in bearing blocks 38 and 39 on the members 23 and 24.

The cleaning and polishing wheels are arranged to be driven by an electric motor 40 which has a pulley 41 over which a V-belt 42 passes. This belt passes over a pulley 43 on the cleaning wheel shaft 31 and a pulley 44 on the polishing wheel shaft 37 so that when the machine is in operation the wheels will turn in a clockwise direction as shown in Fig. 2. The motor 40 is provided with a hinged mounting having a pivot shaft 45 located off center of the motor shaft 46 as shown in Fig. 2, so that the weight of the motor acts to maintain the belt 42 under a suitable tension. A bolt 21' may extend up from the bottom 21 and have nuts 21'' adjustable to limit the downward swinging movement of the motor, if desired.

The preferred form of the invention is arranged to receive a ball in a position intermediate the cleaning and polishing wheels and includes means for supporting and driving the ball while the ball is in contact with one wheel or the other. As shown herein, and more particularly in Figs. 4 to 6, a ball supporting and driving member in the form of a roll 50, preferably of rubber or a like material, is carried on a shaft 51 rotatably supported in bearing blocks 52 and 53 positioned on the lower portions of the channel members 23 and 24. This shaft carries a relatively large pulley 54 which is arranged to be driven by a belt 55 from a relatively small pulley 56 on the polishing wheel shaft 37. Thus, during operation of the machine the driving roll 50 also rotates in a clockwise direction as viewed in Fig. 2.

It is contemplated that when a ball is inserted in the machine it will be placed in about the dash line position B' (as shown in Fig. 6) so as to be supported by the driving roll 50 and the cleaning wheel 30. The weight of the ball then acts to press the ball against the cleaning wheel with sufficient force to perform the cleaning operation. Upon completion of the cleaning operation the ball is adapted to be shifted to the position B'' (as shown in Fig. 6) wherein the weight of the ball functions to keep it in contact with the polishing wheel 36. During the period of the cleaning and polishing operations it is preferable to oscillate the ball laterally of the wheels in a manner to index the ball angularly about a somewhat vertical axis with respect to the wheels to provide contact of the wheels with the entire surface of the ball.

As illustrated herein, a means for oscillating the ball consists of a pair of U-shaped members 60 and 61 which are secured in upright position and in laterally spaced relation on a short inverted channel member 62 (Fig. 6). Preferably the members 60 and 61 are welded to the channel member so as to be rigid therewith. The member 62 is supported for oscillation on a shaft 63 which in turn is supported on bracket member 64 and 65 extending down from the cover plate 25. As shown best in Fig. 5, a bar 66, integral with the member 62, extends in both

directions from said member, one end 67 being normally pressed downwardly by a coiled spring 68. A vertically extended rod 69 has a ball and socket joint 70 at its upper end with the other end 71 of the bar 66 and at its lower end has a ball and socket joint with an angle member 72 which has a side bore engaging an eccentric pin 73 on a shaft 74. The shaft is rotatably supported in a channel member 75 which is integral with and extends downwardly from the cover plate 25. In order to oscillate the members 60 and 61 from the full line to the dotted line position shown in Fig. 5, the shaft 74 is driven by means of a large pulley 76 thereon and a belt 77 connecting to a pulley 78 on shaft 51. During operation of the machine the members 60 and 61 are continuously oscillated with a stroke as indicated.

When a bowling ball B is in the position B' contacting the cleaning wheel 30, the member 60 is effective during its oscillation to roll the ball back and forth on the roll 50 and against the wheel 30. The cleaning and polishing wheels are preferably composed of sections of different diameters so as to have a spool-like form as shown. As the ball is rolled over the cleaning wheel and engages a larger end portion thereof, it receives an angular indexing motion in addition to that which it would have rolling against a wheel of uniform diameter. This indexing motion shifts the ball about a somewhat vertical axis. As the ball rotates on a somewhat horizontal axis by the driving roll 50, the indexing movements at opposite ends of the wheel are in opposite directions but also with different portions of the ball uppermost with the result that a cleaning operation is repeatedly performed over the entire surface of the ball.

Upon completion of the cleaning operation, and to shift the ball from the cleaning wheel to the polishing wheel, the machine is provided with a ball shifting member or finger 80, as shown best in Figs. 2, 4, and 6. This member is in the form of a bent bar normally positioned as shown in Fig. 2 with its upper end positioned under a ball in the cleaning position and a lower horizontally extending portion 81 secured in a channel member 82 pivotally supported on a rod 83 extending from the upright channel 75 (see Fig. 5). A timing mechanism is provided to actuate the member 80 so that after a ball has been contacted by the cleaning wheel for a predetermined length of time, the member 80 swings from the position of Fig. 2 to that shown in Fig. 6 so as to move the ball over the roll 50 sufficiently to cause it to move into the position B'' in contact with the polishing wheel 36.

As illustrated herein the timing mechanism comprises a toothed ratchet wheel 90 carried on a shaft 91 rotatably supported on members 92 and 93 extending downwardly from the cover plate 25. The ratchet wheel carries an eccentric pin 94 which, during the cleaning operation, moves from the position shown in Fig. 2 (counterclockwise) until it has almost reached the position shown in Fig. 6. The pin 94 then engages the adjacent end 81' of the bar 80 and swings it in a clockwise direction to shift the ball from the cleaning wheel to the polishing wheel.

The ratchet wheel 90 is operated by means of a pawl 95 carried on one end of a rod 96, the other end of the rod being connected to the eccentric pin 73 on the shaft 74. Thus, during each revolution of the shaft 74, the wheel 90 is advanced one tooth position. Preferably, a second pawl 97 is provided, hung from a pin 97' from the top frame, so as to prevent reverse rotation of the wheel 90.

As shown in the electrical diagram in Fig. 7, the machine is provided with an attachment plug 100 adapted for connection to a power source. The lines 101 and 102 extend to contacts 103 and 104, respectively, of a relay device R which has an operating coil 105. Switch element 106 of the relay is connected by a wire 107 to one contact of a shut-off switch 108. The other contact of the shut-off switch is connected by a wire 109 to one contact of a coin-operated switch 110 which is of a type that closes and then immediately opens, the other contact of which

is connected by wires 111 and 112 to line wire 101. This places the shut-off and coin switches in series, the shut-off switch being normally closed. The coil 105 has one terminal connected by a wire 113 to a line wire 102 and the other terminal connected by a wire 114 to wire 109. This permits the coin switch 110, upon being closed, to cause energization of the relay.

Preferably, a manual normally open switch 115 is connected in parallel with the coin switch 110 by wires 116, 117, so that, alternatively, the machine may be started manually.

One terminal of the motor 40 is connected by a wire 118 to the other switch element 119 of relay R so that upon closing, line wire 102 is connected to the motor. The other terminal of the motor is connected by a wire 120 to one contact of a lid switch 121 the other contact of which is connected by a wire 122 to wire 107. The lid switch is located on the machine so as to be closed when the lid 13 is closed and thereby prevents starting of the machine if the lid 13 is open. The motor runs continuously until the cleaning and polishing operations have been completed. An eccentric pin 98 on the ratchet wheel 90 is adapted to engage and swing a shut-off arm 125 (which is freely rotatable on shaft 91) from the position shown in Fig. 2, through the position shown in Fig. 6 and to a vertical position from which it drops in a counterclockwise direction (Fig. 2) past the switch 108 and back to the bottom position shown. In passing the switch 108 the shut-off arm actuates the switch and thereby disconnects the motor. The switch 108 is so mounted that after the shut-off arm passes the switch, the switch closes and conditions the circuit for a subsequent cycle of operation.

By lifting the lid 13, a bowler may insert his ball in the machine in the position B' as shown in Figs. 1 and 6. He then closes the lid 13 and starts the machine in operation. If a coin device is used the coin switch 110 is closed by insertion of a coin to effect energization of the relay R. If the machine is started manually, the switch 115 is momentarily closed to close the relay. The shut-off switch 108 is normally closed and with the lid shut the lid switch 121 is closed.

The ball is inserted in contact with the cleaning wheel 30 and the driving roll 50 and while being driven by the roll 50 is continuously oscillated by the U-shaped member 60. Preferably, the U-shaped members have tips 60' and 61' of steel or other material that does not mar the ball. The oscillation of the ball against the cleaning wheel is continuous, the ball being indexed somewhat as it reaches each end of the cleaning wheel so that it turns slightly on a somewhat upright axis.

When the cleaning operation has continued for the time determined by the ratchet wheel 90, the eccentric pin 94 pivots the bar 80 and pushes the ball over the roll 50 from the position B' as shown in Fig. 6 and through the position B so that the ball falls downwardly to the position B'' in contact with the polishing wheel 36. The polishing operation then takes place while the ball continues to be oscillated, now by the U-shaped member 61. Prior to the completion of the polishing operation the eccentric pin 98 on the ratchet wheel engages the shut-off arm 125 and raises the arm to a vertical position. The arm then drops to a lower position and in so doing engages the shut-off switch 108 and stops the machine to end the polishing operation. It is then possible for the bowler to lift the lid 13 and remove the ball.

In a machine of the character described designed principally for cleaning and polishing bowling balls approximately 8 $\frac{5}{8}$ " in diameter a driving roll 50, 1 $\frac{1}{8}$ " in diameter was driven at 350 R. P. M. The central portion of wheels 30 and 36 were 5" in diameter, the adjacent portions 6" in diameter, and the end portions 7" in diameter. The wheels were driven at a speed of 1890 R. P. M. The U-shaped members 60 and 61 were oscil-

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lated from 50 to 55 times per minute with a stroke producing a ball movement of $1\frac{3}{8}$ ". In such a machine complete coverage of the ball during the cleaning operation was obtained each 10 seconds and complete coverage of the ball during a polishing operation was obtained each 15 seconds. Preferably the machine was timed for a cleaning period of $1\frac{1}{4}$ minutes and polishing period of $\frac{3}{4}$ minute.

I claim:

1. A ball cleaning and polishing apparatus comprising a rotatable ball driving member, means for rotating said driving member to cause rotation of a ball in contact therewith, a pair of rotatable buffers arranged on opposite sides of said driving member and with their axes substantially parallel to the axis of the driving member and at a distance therefrom permitting the ball to be supported jointly by said driving member and one of said buffers, each buffer having its ends of a diameter greater than the portion thereof intermediate its ends, means comprising a rocking device for rolling a ball back and forth over the driving member and the buffer with which it is in contact and into engagement with the enlarged ends of the buffer, said engagement of the rotating ball with the enlarged ends of the buffer causing periodic indexing of the ball, means for shifting the ball from one to the other of said buffers comprising a shifting member normally positioned below a ball supported on the driving member and one of the buffers, means operable upon completion of the operation of said buffer on the ball to actuate said ball shifting means, and means for rotating the buffers.

2. A ball cleaning and polishing apparatus as defined in claim 1 wherein one of the rotatable buffers is a wire brush adapted to clean foreign matter from the surface of a ball and the other is a polishing device, and having a timing device comprising a pawl and ratchet mechanism, an eccentric driven during the operation of the buffers to actuate the pawl, and wherein the means for actuating the ball shifting means carried eccentrically upon the ratchet wheel and is operable upon completion of a cleaning interval and a second means carried on said ratchet wheel operable upon completion of a polishing operation to shut down the apparatus.

3. A ball cleaning and polishing apparatus as defined in claim 2 having a connection between the eccentric driving the pawl and the rocking device.

4. A ball cleaning and polishing apparatus comprising a rotatable ball driving member, means for rotating said driving member to cause rotation of a ball in contact therewith, a pair of rotatable buffers arranged on opposite sides of said driving member and with their axes substantially parallel to the axis of the driving member and at a distance therefrom permitting the ball to be supported jointly by said driving member and one of said buffers, each buffer having one of its ends enlarged, a rocking device for rolling a ball back and forth over the driving member and the buffer with which it is in contact and into engagement with the enlarged end of the buffer, said engagement causing periodic indexing of the ball, means operable upon completion of the operation of one of said buffers on the ball to shift the ball into engagement with the other buffer, and means for rotating the buffers.

5. A ball cleaning and polishing apparatus as defined in claim 4 wherein one of the rotatable buffers is a wire brush adapted to clean foreign matter from the surface of a ball, said apparatus having a timing device driven during the operation of the buffers, means operable by said timing device upon completion of a cleaning interval to actuate said ball shifting means and a second means operable by said timing device upon completion of a polishing operation to shut down the apparatus.

6. A ball cleaning and polishing apparatus comprising a continuously rotating ball driving member, means for rotating said driving member to cause rotation of a ball in contact therewith, a pair of rotatable buffers arranged

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on opposite sides of said driving member and with their axes substantially parallel to the axis of the driving member and at a distance therefrom permitting the ball to engage a buffer while driven by said driving member, means comprising ball engaging members oscillatable about an axis transverse to the axis of the driving member for rolling a ball back and forth over the buffer with which it is in contact, means for shifting the ball from one to the other of said buffers upon completion of the operation of one buffer with the ball, and means for rotating the buffers.

7. A ball cleaning and polishing apparatus as defined in claim 6 wherein one of the rotatable buffers is a wire brush adapted to clean foreign matter from the surface of a ball and having a timing device comprising a pawl and ratchet mechanism and an eccentric driven during the operation of the buffers to actuate the pawl, means carried eccentrically upon the ratchet wheel operable upon completion of a cleaning interval to actuate said ball shifting means and a second means carried on said ratchet wheel operable upon completion of a polishing operation to shut down the apparatus.

8. A ball cleaning and polishing apparatus as defined in claim 7 having a connection between the eccentric driving the pawl and the rocking device.

9. A ball cleaning and polishing apparatus comprising a frame, a continuously rotating ball supporting member mounted on said frame, a pair of rotatable buffers mounted on said frame and arranged on axes parallel to the axis of and on opposite sides of said supporting member and at distances therefrom permitting a ball to be supported jointly by the supporting member and the buffer with which it is in contact, means for rotating the buffers, means for moving a ball back and forth over the buffer with which it is in contact to cause the buffer with which it is engaged to buff the entire surface of the ball, and means mounted on said frame and engageable with a ball and movable between the ball supporting member and a buffer for shifting a ball from engagement with one buffer into joint engagement with the supporting member and the other buffer.

10. A ball cleaning and polishing apparatus as defined in claim 9 in which one buffer is in the form of a wire brush and performs a cleaning operation, and having a timing device, means operable by the timing device to actuate the ball shifting means and effect the shift of the ball from the wire brush to the other buffer upon completion of a cleaning operation, and additional means operated by the timing device effective to shut down the operation of the machine upon completion of an operation by said other buffer.

11. A ball cleaning and polishing apparatus comprising, a continuously rotating supporting member for causing rotation of a ball in contact therewith, a pair of rotatable buffers arranged on opposite sides of said driving member and with their axes substantially parallel to the axis of the driving member and at a distance therefrom permitting the ball to be supported jointly by said driving member and one of said buffers, each buffer having its lateral extremities of a diameter larger than the mid portion thereof, means comprising a pair of U-shaped members engageable with a ball and oscillatable about an axis normal to the axis of the driving member for rolling a ball back and forth over the driving member and the buffer with which it is in contact and into alternate engagement with the enlarged extremities of the buffer, said engagement of the rotating ball with the enlarged ends of the buffer causing periodic indexing of the ball about an axis substantially normal to the path of rolling movement of the ball, means for shifting the ball from one to the other of said buffers comprising a finger pivotally mounted beneath the driving member and extending to a position beneath a ball supported on the driving member and one of the buffers, said finger when actuated causing movement of the ball into engagement with the

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other buffer, and rotatable timing means operable upon completion of the operation of said one buffer on the ball to actuate said finger.

12. In a ball cleaning and polishing apparatus, in combination, a frame, a continuously rotating ball supporting member mounted in said frame, a pair of rotatable buffers mounted in said frame, said buffers being arranged on axes parallel to the axis of and on opposite sides of said supporting member and at distances therefrom permitting a ball to be supported jointly by the supporting member and the buffer with which it is in contact, means for rotating the buffers, and means mounted on said frame independently of said ball supporting member and buffers for shifting a ball from one buffer to the other including a member movable between the ball supporting member and a buffer to engage and shift a ball from engagement with the last mentioned buffer and into engagement with the other buffer.

13. A ball cleaning and polishing apparatus as defined in claim 12 in which one buffer is in the form of a wire brush and performs a cleaning operation, and having means for moving a ball back and forth across the surface of the wire brush during a cleaning operation.

14. A ball cleaning and polishing apparatus as defined in claim 13 having a timing device, means operable by the timing device to actuate the ball shifting means and effect the shift of the ball from the wire brush to the other buffer upon completion of a cleaning operation and additional means operated by the timing device effective to shut down the operation of the machine upon completion of an operation by said other buffer.

15. A ball cleaning and polishing apparatus comprising, a continuously rotating supporting and driving

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member for causing rotation of a ball in contact therewith, a pair of rotatable buffers arranged on opposite sides of said driving member and with their axes substantially parallel to the axis of the driving member and at a distance therefrom permitting the ball to be supported jointly by said driving member and one of said buffers, each buffer having its ends of a diameter larger than the mid portion thereof, means engageable with a ball and oscillatable about an axis normal to the axis of the driving member for rolling a ball back and forth over the driving member and the buffer with which it is in contact and into alternate engagement with the enlarged ends of the buffer, said engagement of the rotating ball with the enlarged ends of the buffer causing periodic indexing of the ball about an axis substantially normal to the path of rolling movement of the ball, means for shifting the ball from one to the other of said buffers comprising a pivotally mounted element extending to a position beneath a ball supported on the driving member and one of the buffers, said element when actuated causing movement of the ball into engagement with the other buffer, and rotatable timing means operable upon completion of the operation of said one buffer on the ball to actuate said element.

References Cited in the file of this patent

UNITED STATES PATENTS

1,726,161	Murphy	Aug. 27, 1929
2,179,459	Vreeland	Nov. 7, 1939
2,297,377	Willard	Sept. 29, 1942
2,378,418	Lister	June 19, 1945
2,528,341	Creely	Oct. 31, 1950
2,588,714	Fleming	Mar. 11, 1952