

Sept. 23, 1930.

R. R. RUNDELL

1,776,395

SELF OPENING AND CLOSING CONTAINER CAP

Original Filed Oct. 15, 1927 2 Sheets-Sheet 1

Fig. 1.

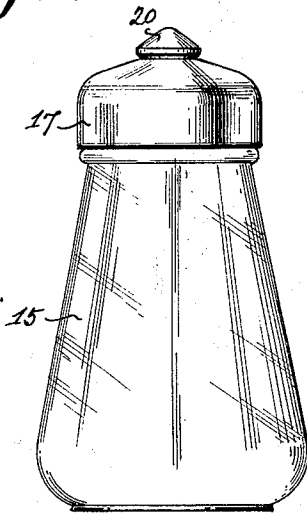


Fig. 2.

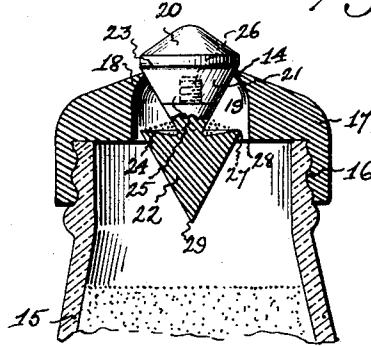


Fig. 3.

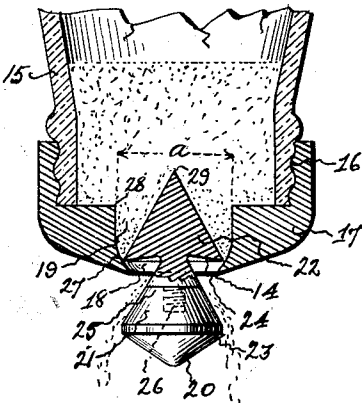


Fig. 4.

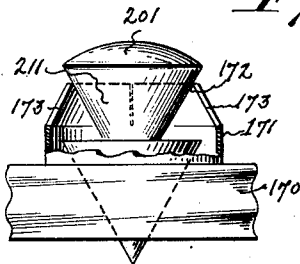
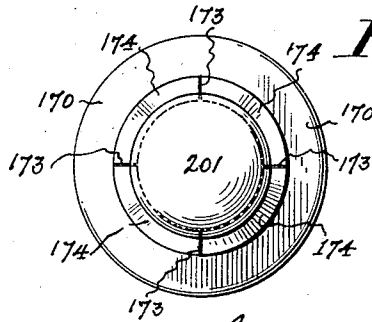


Fig. 5.



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Fig. 6.

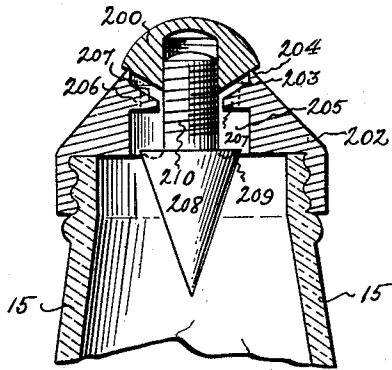


Fig. 8.

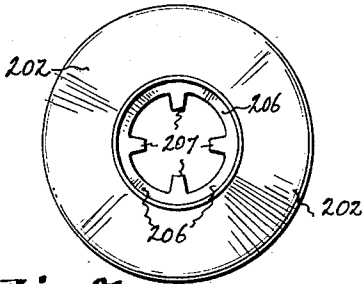
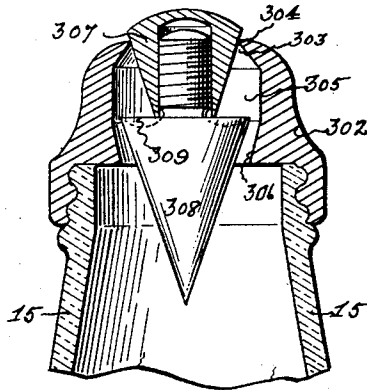


Fig. 7.

Fig. 11.

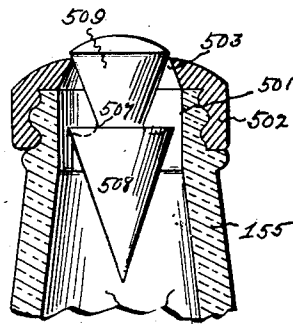
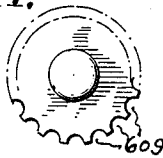


Fig. 10.

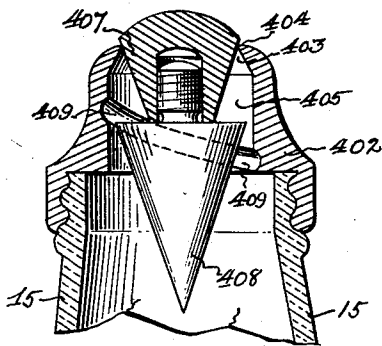


Fig. 9.

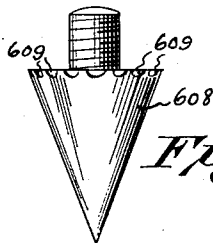


Fig. 12.

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# UNITED STATES PATENT OFFICE

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## SELF-OPENING AND CLOSING CONTAINER CAP

Application filed October 15, 1927, Serial No. 226,360. Renewed October 24, 1929.

This invention relates to receptacles, cans, condiment holders, or the like, and more especially to self opening and closing caps for the top of said receptacles, holders, or cans designed to contain or dispense powder, granulated material, or similar goods.

The objects of the invention are:

First, to provide a closure of the character above indicated which is capable of being made and sold as a separate cover for a container, or made part of the container, and consists of a minimum number of parts adapted to be easily and cheaply manufactured by casting, dies or lathe work and of any non-breakable and attractive and variety of materials, capable of being quickly assembled and at all times correctly and properly function in sealing the discharge opening when said container is not in use and insuring an ejection or discharge of the desired or measured amount of material under all conditions of service and atmospheric conditions.

Second, to provide a closure of the character above indicated which is sanitary and will automatically and properly open or expose the discharge opening or openings through which the contents of the container or holder escape when said container is turned upside down or automatically return said closure to its usual and seating position to tightly seal said opening when said container assumes its normal position to prevent access of moisture into the container when not in use.

Third, to provide a closure of the character above described which will eject the material within the container in only predetermined quantities whether said material is in a pulverized or granulated state or formed in lumps or in non-flowing or damp condition due to the absorption of moisture.

Fourth, to provide a closure which is capable of easy adjustment to vary the quantity of material ejected from the interior of the container, and permit said adjustment without in any way interfering with the construction and cooperation of the support or carrier of said adjustable closure or the means for securing said support or carrier to the container.

Fifth, to provide an adjustable or non-ad-

justable stopper or valve for closing the discharge opening of a container which is capable by its contour and weight of not only forcibly ejecting a certain and predetermined amount of material through said discharge opening, but at the same time break up the lumps of material formed or lodged in the outlet passage of the container and the lumps of material within the container before passing into the outlet passage.

Sixth, to provide an adjustable or non-adjustable stopper or valve for closing the discharge opening of a container which is capable by its contour and weight of not only forcibly ejecting a certain and predetermined amount of material through said discharge opening, but at the same time seal the discharge opening thus positively checking the flow of any additional material.

Seventh, other objects and advantages of the invention will appear from the detailed description of the several parts, manner of assembling the same and their cooperation.

The invention consists of structural characteristics and relative arrangement of the several parts which will be hereinafter more fully described and particularly pointed out in the appended claims.

In the two sheets of drawings, in which the same reference characters indicate the same parts in the different figures of drawings,

Figure 1 is a side elevation of the container or receptacle provided with the improved self opening and closing stopper or valve;

Figure 2 is an enlarged fragmentary vertical section of the improved stopper or valve in its normal or closed position;

Figure 3 is a view similar to Figure 2, showing the position the parts of the stopper or valve will assume when the container is turned upside down;

Figure 4 is a side elevation partly in section of a modified form of closure removed from a container;

Figure 5 is a top plan view of the form shown in Figure 4;

Figure 6 is a view similar to Figure 2 of another form of the invention;

Figure 7 is a top plan view of the closure

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75  
80  
85  
90  
95  
100

shown in Figure 6 with the valve or stopper removed;

Figures 8, 9 and 10 are views similar to Figures 2 and 6 of further modified forms of the invention;

Figures 11 and 12 are respectively top plan and side elevation of a possible variation of the inner or ejecting section of the valve or stopper.

Referring to Figures 1, 2 and 3, 15 is the body of the receptacle, container or can which is adapted to receive the powder or granulated material and may be of any desired shape and material and provided with or without the threads 16, as shown.

Secured to the open end of the container 15 by means of threads 16 or otherwise is provided a top or cover 17 which may be made either by pressing, molding or turning operation and of bakelite, fiber, rubber, celluloid, glass, or other suitable material or composition, preferably incapable of absorbing moisture.

Within said top, cover or cap is formed a discharge opening 18 formed with a valve seat 14 and an inner substantially cylindrical receiving chamber 19 adjacent to and merging or contracting towards and communicating with the discharge opening 18, as shown in Figure 2, through which the contents of the container or receptacle are permitted to discharge in the manner to be presently described.

Loosely disposed within and seated in said discharge opening 18 and receiving chamber 19 is provided a gravity or automatically operated valve or stopper 20, preferably consisting of two substantially cone-shaped sections 21 and 22 whose bases 23 and 24 are of a greater diameter than the normal diameter of the discharge opening 18. The base 23 of the upper section 21 is exterior of the top or cap 17, and the sides of the section 21 under and adjacent to the base 23 rest in seat 14, and its apex 25 is within said chamber 19, while the base 24 of the lower or weighted section 22 is within and loosely sliding in the chamber 19, and is connected to the apex 25 of the upper section 21 by means of a threaded pin 26 engaging a threaded socket in said inner apex 25, as shown in Figure 2.

This separable and adjustable connection between the sections 21 and 22 not only enables the assembling of the same to assume the relations with respect to each other and the chamber 19 and discharge opening 18, as shown in Figure 2, but at the same time permits the distance between the two sections 21 and 22 and their bases 23 and 24 to be varied, so that the distance the valve or stopper travels controlling the discharge of the material can be accordingly varied and at the same time permit the distance of the circular outer edge 27 of the base 24 to be changed with respect to the plane and

circular outer edge 28 of the base 23 for purposes of varying the quantity of material ejected from the container by said section 22 to be later described.

The plane of the base 24 of the lower section 22 may be dished, as shown, and its periphery or outer rim 27 is preferably formed with a sharp or cutting edge to make a close contact with the walls of the chamber 19 and at the same time easily cut through or disintegrate the material passing through the chamber 19 during the discharging operation of the container.

The apex 29 of the lower section 22 is made pointed so that it will pierce and break up any lumps formed in the granulated or pulverulent material to be dispensed or discharged when the container is inverted and the adjustable upper and lower sections 21 and 22 may be made of any weighty material, as steel, lead, or other metal, or their alloys, or of bakelite, fiber, or other composition, or combination of said metals and compositions and preferably of any material which is not hygroscopic thereby preventing the discharged material from sticking to the discharge opening 18 or valve sections 21 and 22.

Figures 4 and 5 show substantially the same invention as shown and described with reference to Figures 1 and 2, except there is disclosed a top or cover 170 made of metal in which its upper frusto-shaped section 171 as having a discharge opening 172 and provided preferably with four slits 173 which form four yielding sections 174 so as to permit the upper section 211 of the valve 201 or stopper to be pushed or forced through the discharge opening 172 and assume the position shown in Figure 4, after the sections 174 spring back to their normal position, as will be readily understood.

The valve or stopper 201 employed in this modification is substantially of the same construction and made of the same material or materials as that disclosed with respect to Figures 1 and 2, and needs no further disclosure, and is preferably made of one piece.

Figures 6 and 7 show substantially the same organization and arrangement of elements as explained with reference to Figures 1 and 2, except that the cover or top 202 is provided with a discharge opening 203 and a valve seat 204 and a receiving or discharge chamber 205 having at the position shown a shut off collar or shoulder 206 having radially projecting lugs 207. The gravity operated valve or stopper 200 used in connection with this modification is substantially the same in construction and capable of the same adjustment as the valve 20 described with respect to Figures 1 and 2, except that the lower cone section 208 is made longer to add weight, if found desirable, and its base 209 is adapted to engage and be seated against the underside of

the annular shoulder or collar 206 to shut off the discharge of the material while the lugs 207 act as guides for the threaded medial section 210 to properly align and operate the valve or stopper 200 when the container is reversed and ejection of the material is being effected.

Figure 8 is a modification of the same general construction as shown and described with reference to Figures 1, 2 and 6, except that the closure or cover 302 having discharge opening 303 and seat 304 is provided with a receiving chamber 305 which is lengthened and also decreased in diameter or contracted at its lower end or extremity 306, which shape is for the purpose of retaining in said chamber 305 any moist or damp granulated material, such as salt, when the lower or pointed section 308 of the valve 307 passes through the same in its movement towards the bottom of the container.

The valve 307 is of the same construction and permits its sections to be adjusted relatively to each other as the valves heretofore explained to regulate the distance the base 309 of section 308 of stopper 307 reciprocates in the chamber 305, and thereby control the amount of material ejected through the discharge opening 303.

Figure 9 shows the same construction and arrangement as described with reference to Figure 8 with respect to the closure or cover 402 having discharge opening 403 and seat 404, receiving chamber 405, valve 407, and its adjustable pointed bottom weighted section 408, except that the inner cylindrical wall within the cover 402 and forming the receiving chamber 405 is provided with a thread depression or spiral groove 409 to retain or sustain any damp granular material or salt which might be deposited in said chamber 405 and, hence, can be engaged or ejected or thrust out of the discharge opening 403 on the reciprocation of the lower or bottom weighted section 408 of the valve 407, as will be readily understood.

Figure 10 shows a small type of container or condiment holder 155 in which the inside diameter of the passageway 501 in the neck of said container, preferably made of glass, is slightly larger in diameter than the discharge opening 503 in the closure or top 502 and said cylindrically formed passageway 501 in the neck is utilized to perform the function of a receiving chamber in which the weighted lower section 508 of a valve or stopper 507 operates. The upper and lower sections 509 and 508 are preferably made integral, as shown, and are made of special lead or other alloy that is capable of receiving polish. In order to assemble the parts, as shown in Figure 10, there is provided a closure or top 502 with a discharge opening 503 of an original diameter slightly larger than the maximum diameter of the upper section

509 of the stopper 507. The upper section 509 is then inserted up through from the underside of said closure or top 502 and then the outer side of said opening 503 of the top or closure 502 on which the upper section 509 seats is decreased in diameter by a special tool or by a spinning operation, when said valve or stopper 507 is movably secured to the closure or top 502 and adapted to reciprocate in the passageway 501 and perform its functions similar to valves or stoppers heretofore described.

This last modification or design is capable of producing at a minimum cost a salt shaker made of any of the materials herein described, and any of the features shown or described with respect to Figures 8, 9 and 11 could be incorporated in the valve or inside of the neck, if so desired, without in any way changing the operations or functions of the other features of the invention.

Figures 11 and 12 show a special or modified form of the lower and adjustable bottom weighted section of the valve or stopper, and could be readily substituted for the weighted or lower sections 308 and 408 shown in Figures 8 and 9, and said modified section 608 is provided with notches or serrations 609 cut or formed on the outer edge or periphery of its base or shoulder, as illustrated, said notches or serrations having the functions of not only reducing the friction and permitting the shoulder or base section to reciprocate or move freely in the receiving chamber, but at the same time said notches or serrations assist in breaking up any lumps of the granulated material or salt formed by dampness and finding its way in said receiving chamber.

The operation of the invention is as follows:

The container or shaker on being moved quickly in its inverted position the pointed end or bottom of the inner or lower and weighted section of the valve or stopper during its "in" stroke passes through the granulated material or salt within the container and adjacent to the stopper or valve and owing to the valve or stopper being heavier than the material or salt travels faster than the lighter substance, the conical or tapered portion of the lower and weighted section of the valve or stopper diverts the material or salt just ahead of its shoulder or base in which the conical or tapering portion terminates. On the "out" stroke of the stopper or valve this shoulder or base carries forward substantially the entire amount of material or salt engaged or picked up by the base or shoulder and at the end of its "out" stroke forcibly ejects said material or salt through the discharge opening, and immediately thereafter this base or shoulder seats against the inner cylindrical wall section adjacent to the discharge opening, as shown in Figure

3, and cuts off the flow of any additional material or salt from the receiving chamber or container and insures a uniform and regulable quantity of granular material or salt being discharged at each stroke or reciprocation of the valve or stopper independent of the condition of said granular material or salt as to dryness or dampness, and the quantity of material ejected can be controlled by varying the travel of the valve or stopper on the "in" stroke, and, if desired to obtain a large amount of material quickly, invert container and slightly depress valve or stopper with finger.

It will be seen from the construction, arrangement and cooperation of the elements comprising the present invention and manner of using the same, that although the same is simple and inexpensive to manufacture, the same fully and efficiently carries out all the functions and operations and has all the advantages recited in the statement of invention, and that the container or receptacle equipped with the disclosed valve or stopper will retain granular material, as sugar, dry longer than heretofore and discharge or eject said material or salt no matter how damp, is sanitary and the quantity of discharged material at each operation is uniform and, if so desired, said discharge can be quickly varied by means of adjustments easily accomplished.

It is also obvious many changes or modifications would readily suggest themselves, or may be resorted to without departing from the spirit and essentials of the invention, and, therefore, I do not wish to be limited to the exact combination and arrangement herein shown and described, as, for example, the clearance between outside diameter of the lower weighted section of the stopper or valve with respect to the surrounding wall of the chamber in which it reciprocates may be increased or decreased depending upon the nature of the material to be dispensed, as, for example, sugar, spices, pepper, or like material, and while I have particularly referred to material of granular structure, other substances than granular are capable of being dispensed by the disclosed features of construction.

What I claim is:—

1. A container and dispenser, comprising a receptacle having a discharge opening with a circular edge and a receiving chamber within said receptacle and adjacent to said opening, a stopper reciprocating within and controlling said discharge opening and consisting of two imperforate substantially cone-shaped sections whose bases are incapable of passing through said discharge opening, the base of one of said cone-shaped sections being exterior of the receptacle and its apex within said chamber and its intermediate conical portion adapted to be seated on said

circular edge, and the base of the other section being slidably mounted with a small clearance within said chamber and directly attached to the inner apex of the other cone-shaped section, and its outer circular periphery having an edge adapted to be seated within and against the wall of the chamber adjacent to the circular edge of the discharge opening and eject the material within said receiving chamber when said container is inverted and cut off the discharge through said opening.

2. A container and dispenser, comprising a receptacle having a discharge opening with a circular edge and a receiving chamber within said receptacle and adjacent to said opening, a stopper reciprocating within and controlling said discharge opening and consisting of two imperforate substantially cone-shaped sections whose bases are incapable of passing through said discharge opening, the base of one of said cone-shaped sections being exterior of the receptacle and its apex within said chamber and its intermediate conical portion adapted to be seated on said circular edge, and the base of the other section being dished and weighted and slidably mounted with a small clearance within said chamber and directly attached to the inner apex of the other cone-shaped section, and its outer circular periphery having an edge adapted to be seated within and against the wall of the chamber adjacent to the circular edge of the discharge opening and eject the material within said receiving chamber when said container is inverted and cut off the discharge through said opening.

3. A container and dispenser, comprising a receptacle having a circular discharge opening with an annular inner edge and a receiving chamber within said receptacle and adjacent to said opening, a self-opening and closing valve within and for controlling said discharge opening and consisting of two imperforate substantially cone-shaped sections whose bases are of a greater diameter than that of the discharge opening, the base of one of said sections being exterior of the receptacle and its apex within said chamber and its intermediate conical portion adapted to be seated on said annular edge, and the base of the other section being slidably mounted within said chamber with a small clearance, and directly attached to and adjustable with respect to the apex of the other cone-shaped section to vary the distance between the two bases of said cone-shaped sections, and its outer circular periphery having an edge adapted to be seated within and against the wall of the chamber adjacent to the annular inner edge of the discharge opening and eject the material within said receiving chamber when said receptacle is inverted and cut off the discharge through said opening.

4. A container and dispenser, comprising

a receptacle having a discharge opening with a circular edge and a receiving chamber provided with a groove within said receptacle and adjacent to said opening, a stopper reciprocating within and controlling said discharge opening and consisting of two imperforate substantially cone-shaped sections whose bases are incapable of passing through said discharge opening, the base of one of said cone-shaped sections being exterior of the receptacle and its apex within said chamber and its intermediate conical portion adapted to be seated on said circular edge, and the base of the other section being slidably mounted with a small clearance within said chamber and directly attached to the inner apex of the other cone-shaped section, and its outer circular periphery having an edge adapted to be seated within and against the wall of the chamber adjacent to the circular edge of the discharge opening and eject the material within said receiving chamber when said container is inverted and cut off the discharge through said opening.

5. A receptacle for dispensing comminuted material, comprising a container provided with a discharge throat terminating at its outer end in a restricted thin edged discharge orifice, and a plunger adapted to reciprocate loosely in said throat, said plunger having a surface capable of supporting small quantities of said material when the container is in upright position and movable to the edge of said orifice to discharge the material when the plunger is reciprocated and prevent the material carried by the plunger from packing below said edge.

6. A receptacle for dispensing comminuted material, comprising a container provided with a discharge throat terminating at its outer end in a restricted thin edged discharge orifice, a plunger adapted to reciprocate loosely in said throat, said plunger having a surface capable of supporting small quantities of said material when the container is in upright position and movable to the edge of said orifice to discharge the material when the plunger is reciprocated and prevent the material carried by the plunger from packing below said edge, and means for limiting the throw of the plunger in each direction of movement.

7. A receptacle for dispensing comminuted material, comprising a container provided with a discharge throat terminating at its outer end in a restricted thin edged discharge orifice and a plunger adapted to reciprocate loosely in said throat, said plunger having an inner and an outer portion disposed respectively on opposite sides of the orifice and incapable of passing there-through, the inner portion comprising a surface capable of supporting small quantities of said material when the container is in upright position and movable to the edge of the

orifice to eject said material through the orifice when the plunger is reciprocated and prevent the material carried by the plunger from packing below said edge.

8. A receptacle for dispensing comminuted material, comprising a container having a discharge throat terminating at its outer end in a thin edged discharge orifice, a plunger loosely reciprocable within the throat and having a surface adapted to seat against the edge of the orifice when the container is in inverted position, said surface being capable of supporting small quantities of said material when the container is in upright position, and an exteriorly disposed stopper connected to the plunger and adapted to close the orifice when the container is in upright position.

9. A receptacle for dispensing comminuted material, comprising a container having a discharge throat terminating at its outer end in a thin edged discharge orifice, a plunger loosely reciprocable within the throat and having a surface adapted to seat against the edge of the orifice when the container is in inverted position, said surface being capable of supporting small quantities of said material when the container is in upright position, an exteriorly disposed stopper connected to the plunger and adapted to close the orifice when the container is in upright position, and means for adjusting the spacing of said stopper with respect to said surface.

10. A receptacle for dispensing comminuted material, comprising a container having a discharge throat terminating at its outer end in a thin edged discharge orifice, a plunger loosely reciprocable within the throat and having a surface adapted to seat against the edge of the orifice when the container is in inverted position, said surface being capable of supporting small quantities of said material when the container is in upright position, and an exteriorly disposed stopper connected to the plunger and adapted to close the orifice when the container is in upright position, the plunger and the stopper being each in the form of an inverted cone.

11. A receptacle for dispensing comminuted material, comprising a container formed with a discharge throat terminating at its outer end in a restricted thin edged discharge orifice, a closure member loosely reciprocable in the throat and projecting through the orifice, said closure member having surfaces disposed respectively on opposite sides of the orifice to limit the throw of the plunger and seat against the edge of the orifice when the plunger is at opposite limits of its movement, the inner one of said surfaces being capable of supporting a small quantity of said material when the container is in upright position, and being substanti-

ally in engagement with the edge of the orifice when in sealing position.

12. A receptacle for dispensing comminuted material, comprising a container formed with a discharge throat terminating at its outer end in a restricted thin edged discharge orifice, a closure member loosely reciprocable in the throat and projecting through the orifice, said closure member having surfaces disposed respectively on opposite sides of the orifice to limit the throw of the plunger and seat against the edge of the orifice when the plunger is at opposite limits of its movement, the closure member having an edge adapted to scrape said material from the throat and discharge the same through the orifice when the container is shaken in inverted position.

In testimony whereof I hereunto affix my signature.

RAYMOND R. RUNDELL.

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