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May

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[54] **PORTABLE SANITARY TOILET**

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[73] Assignee: **The Coleman Company, Inc.**, Wichita, Kans.

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[52] **U.S. Cl.** **4/142**, 4/121, 4/135

[51] **Int. Cl.** **A47k 11/02**

[58] **Field of Search**.....4/1, 111, 142, 115, 116, 117, 4/119, 121–127, 128, 130, 134, 137–138, 141, 143–144

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Assistant Examiner—Henry K. Artis
Attorney—Dawson, Tilton & Lungmus

[57] **ABSTRACT**

A portable sanitary toilet which utilizes an elongated flexible plastic tube to collect waste material is provided with an operating mechanism for advancing and sealing the tube after each use. The operating mechanism includes a pair of rotatably mounted pincher arms which are resiliently biased toward each other to seal the tube therebetween until the tube is to be advanced. A pair of roller-equipped axles are rotatably mounted below the sealing portions of the pincher arms, and the axles are resiliently biased toward each other to form a tube-advancing nip between the engaging rollers. A foot crank is secured to one of the pincher arms to impart rotation to that pincher arm, and the other pincher arm is caused to rotate by a crank follower arm which engages the crank. A gear and ratchet connection between the crank and one of the axles causes the rollers to rotate when the pincher arms are separated to advance the tube and the collected waste material. Upon release of the foot crank, the pincher arms return to seal the tube.

12 Claims, 10 Drawing Figures

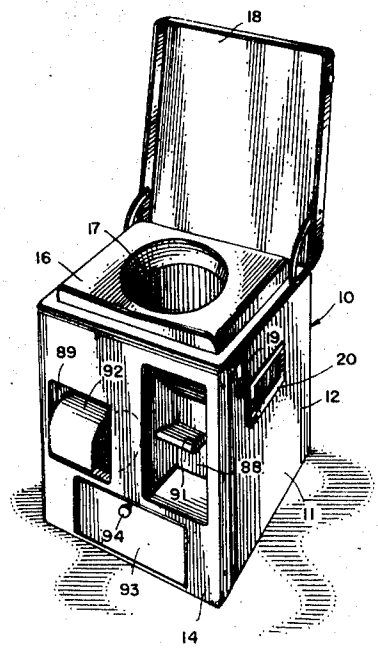


FIG. 1

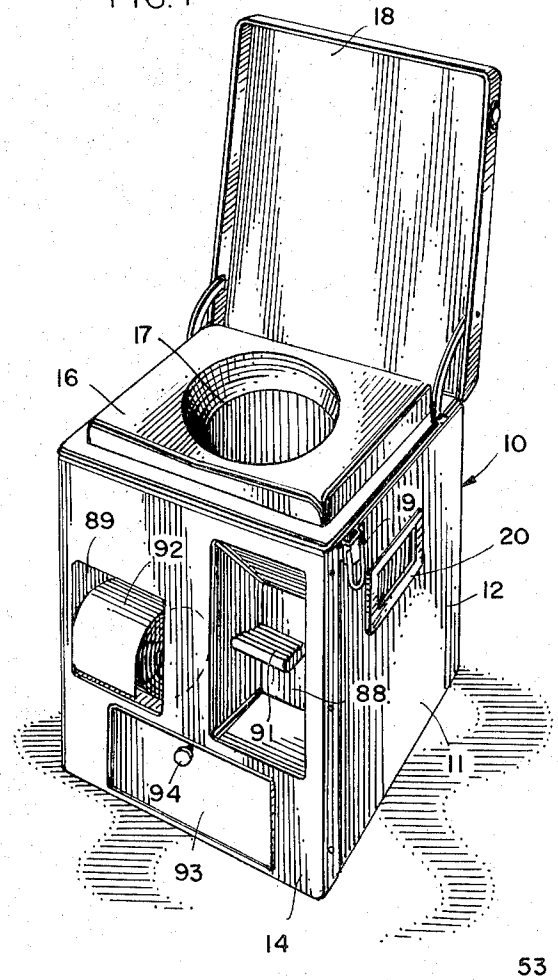
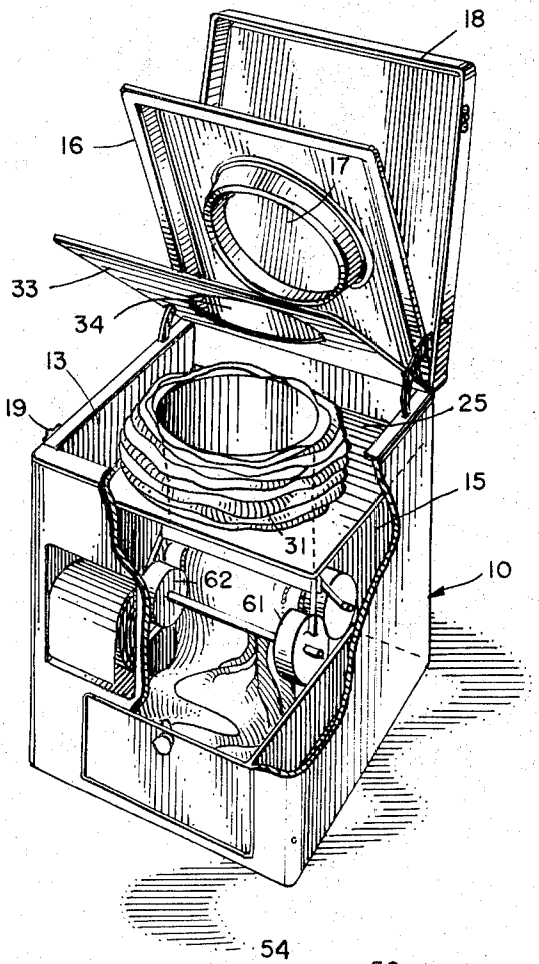


FIG. 2



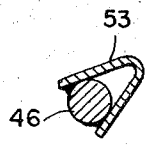


FIG. 9

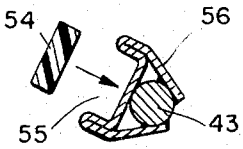


FIG. 10

FIG. 6

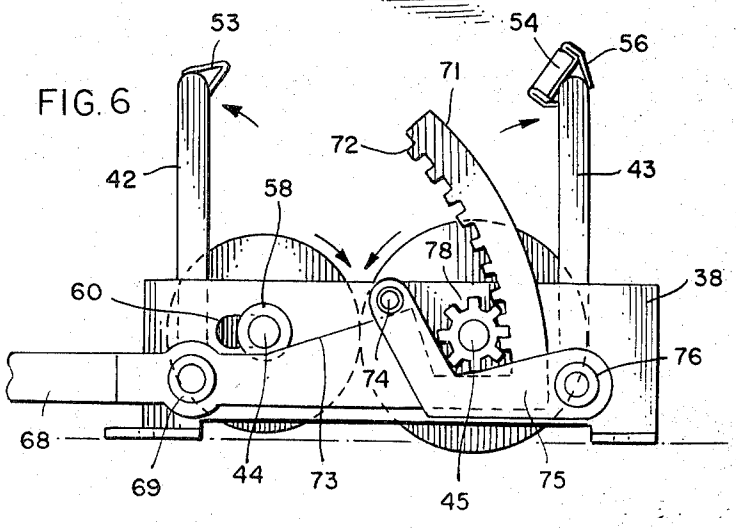


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FIG. 3

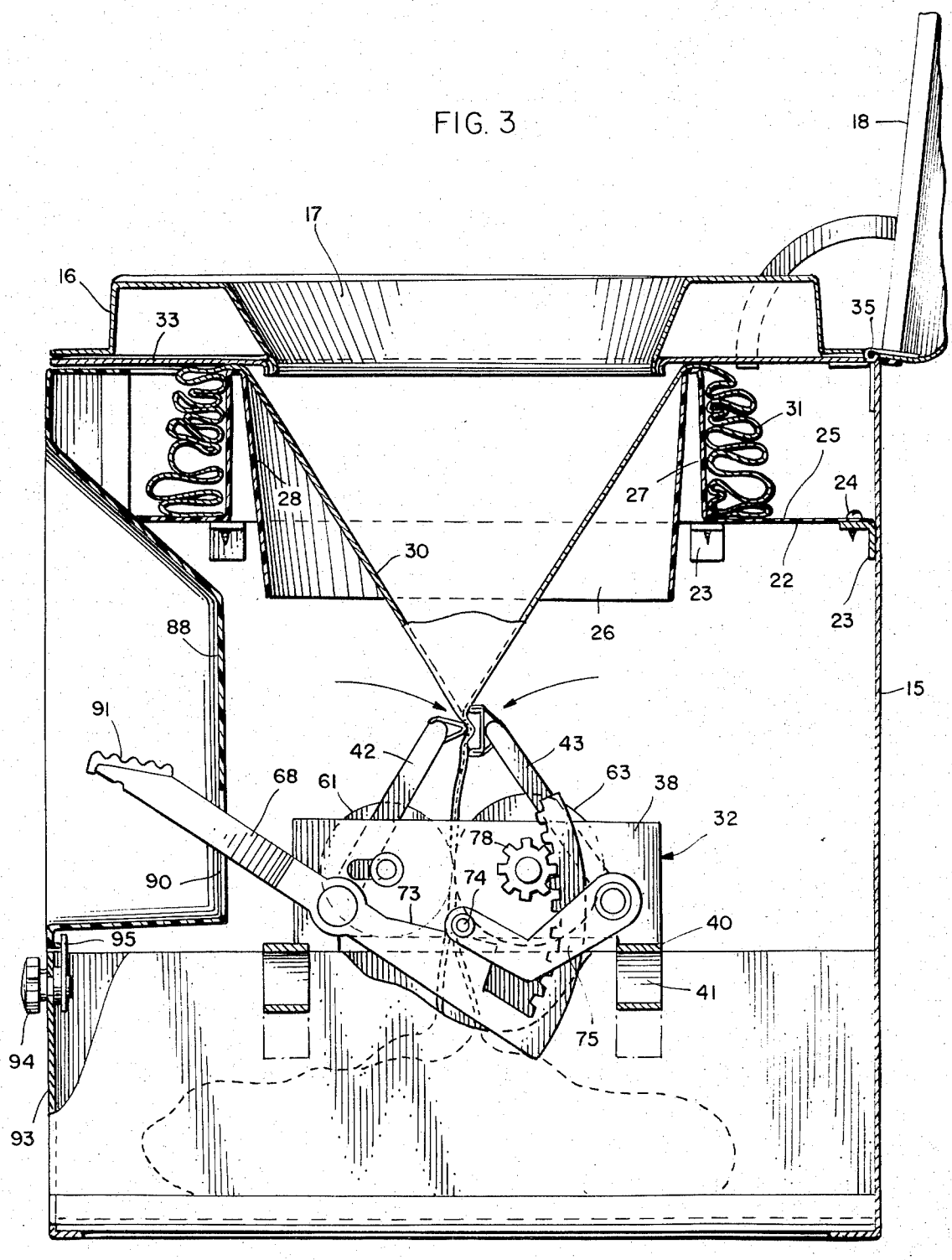

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FIG. 7

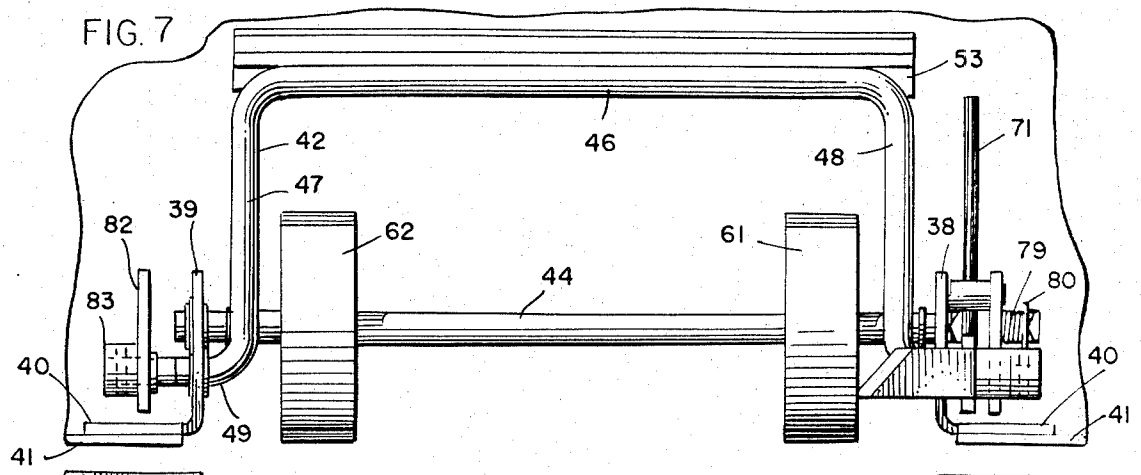


FIG. 8

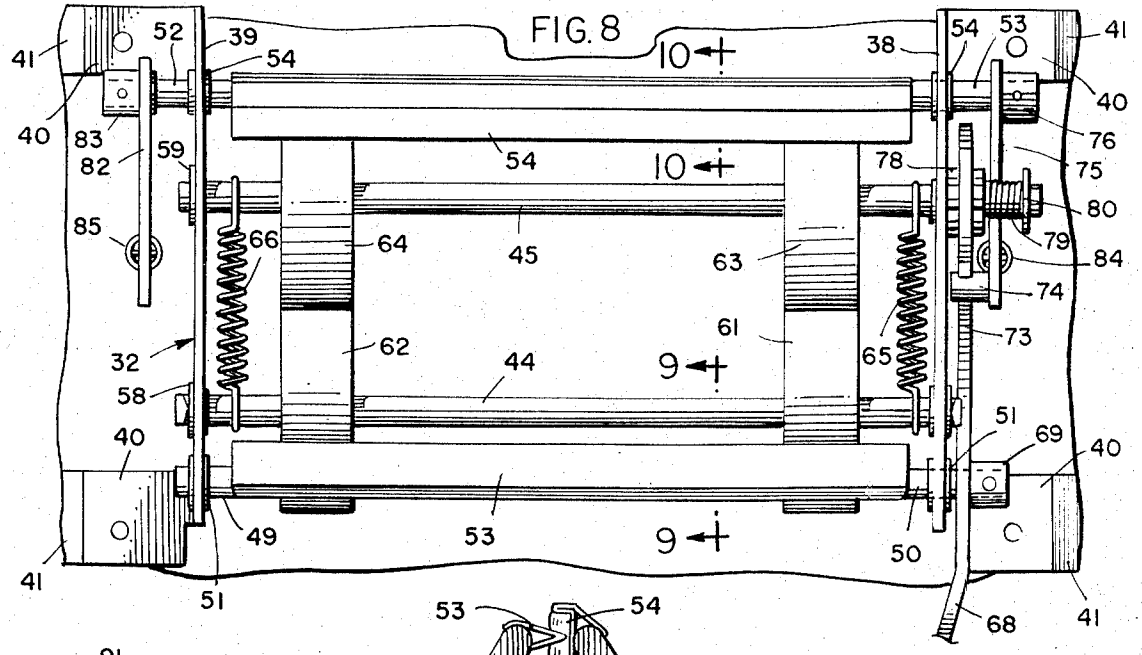


FIG. 4

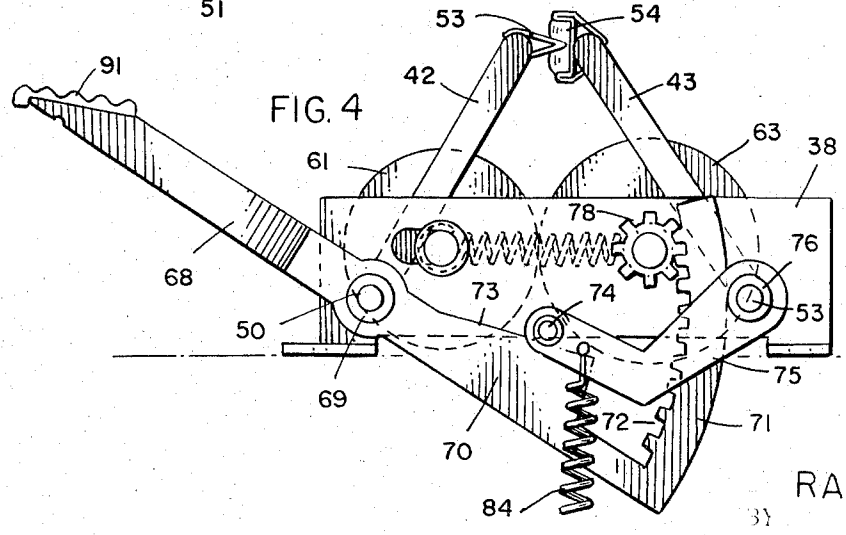
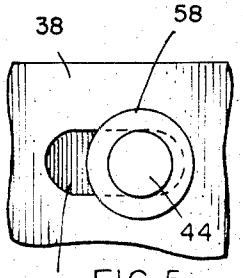


FIG. 5



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PORTABLE SANITARY TOILET

BACKGROUND AND SUMMARY

This invention relates to portable sanitary toilets, and more particularly, to portable sanitary toilets of the dry type which utilize a plastic tube-like web or bag to collect the waste material.

Campers, hunters and other outdoorsmen often prefer to bring sanitation facilities with them to the campsite, and various types of portable sanitary toilets have been provided. Many of these have not proved to be entirely satisfactory, however. A portable toilet should be capable of being used several times before the waste material must be removed therefrom, and the waste material should be collected in a safe, sanitary manner with a minimum emission of odors. It should be possible to empty the toilet easily when desired, and it should also be possible to prepare the toilet for further use after emptying without difficulty. Further, it is desirable that the operation of the toilet be simple enough to permit use thereof by a child.

The invention provides a toilet which collects the waste material in an elongated tube-like plastic bag. The bag is stored in a folded condition beneath the toilet seat and extends downwardly into a waste-receiving chamber. A pair of pincher arms below the toilet seat pinch the opposite sides of the tube together to provide a substantially odor-tight seal and each edge of the flattened bag extends between a pair of rollers. After the toilet is used, all that need be done to dispose of the waste is to step on the foot crank. Rotation of the foot crank and the associated crank follower arm opens the pincher arms while the rollers rotate to advance the used part of the bag into the waste chamber. Release of the foot crank returns the pincher arms into sealing engagement with the bag, and the toilet is ready for further use. When desired, the used portion of the bag and the waste material contained therein can be removed from the bottom portion of the toilet, and the toilet can be prepared for further use merely by depressing the foot crank to separate the pincher arms and inserting a new bag between the rollers.

DESCRIPTION OF THE DRAWINGS

The invention will be explained in conjunction with an illustrative embodiment shown in the accompanying drawings, in which:

FIG. 1 is a perspective view of a toilet formed in accordance with the invention;

FIG. 2 is a view similar to FIG. 1 partially broken away to show the interior of the toilet and with the toilet seat and urine deflector raised;

FIG. 3 is an enlarged side elevational sectional view of the toilet;

FIG. 4 is an enlarged view of the operating mechanism with the pincher arms closed;

FIG. 5 is an enlarged fragmentary view of a portion of FIG. 4;

FIG. 6 is a view similar to FIG. 4 with the pincher arms open;

FIG. 7 is a front elevational view of FIG. 6;

FIG. 8 is a top plan view of FIG. 6.

FIG. 9 is a sectional view taken along the line 9—9 of FIG. 8; and

FIG. 10 is an exploded sectional view taken along the line 10—10 of FIG. 8.

DESCRIPTION OF SPECIFIC EMBODIMENT

Referring now to FIGS. 1 and 2, the numeral 10 designates generally a portable sanitary toilet comprising a generally box-like casing 11 having opposite side walls 12 and 13, and front and rear walls 14 and 15. The top of the casing is closed by a toilet seat 16 having a central opening 17 and a cover 18 that is secured to the rear wall 15 for covering the toilet seat when the toilet is not in use. Latches 19 may be secured to the side walls for locking the cover in the closed position, and the side walls may also be equipped with handles 20 to facilitate carrying the toilet.

Referring now to FIGS. 2 and 3, a collar plate 22 is secured within the casing below the toilet seat by means of attaching flanges 23 and screws 24. The collar plate includes an outer plate or peripheral portion 25 and a central collar portion 26 which includes a generally vertical outer cylindrical wall 27 and an inner frusto-conical wall 28 which converges downwardly and inwardly. The upper end of the frusto-conical inner wall 28 is seen to have a diameter slightly greater than the minimum diameter of the central opening 17 of the toilet seat, which is also substantially frusto-conical.

An elongated tube 30 of flexible, water-impermeable plastic or like material is folded or pleated in accordion-like fashion as at 31 around the outer wall 27 of the collar plate and extends downwardly through the opening of the collar plate to the operating mechanism designated generally by the reference numeral 32. A generally planar urine deflector plate 33 is interposed between the toilet seat 16 and the top of the collar portion 26 of the collar plate and is provided with a central opening 34 having a diameter slightly less than the maximum diameter of the frusto-conical wall 28 of the collar plate. The toilet seat 16 and the urine deflector plate 33 are also hingedly secured to the back wall 15, and, if desired, the top 18, the toilet seat 16, and the deflector plate 33 can all be secured by the same piano hinge 35 by attaching each of these parts to separate leaves of the hinge.

The operating assembly 32 includes a pair of vertically extending frame plates 38 and 39 (FIGS. 7 and 8) which are secured to the side walls 12 and 13, respectively, of the casing by means of a foot portion 40 extending outwardly from each end of each end plate. Each foot portion is supported by a bracket 41 secured to one of the side walls. The plates 38 and 39 rotatably support a pair of pincher arms 42 and 43 and a pair of roller-equipped axles 44 and 45.

As can be seen best in FIG. 7, the pincher arm 42 is generally U-shaped and includes a central or pinching portion 46 and opposite side portions 47 and 48. The end of each of the side portions of the pincher arm turn outwardly in opposite directions to provide journal portions 49 and 50, respectively, which extend through bushings 51 mounted within suitable openings in the frame plates. The pincher arm may advantageously be formed of rod stock which is bent to the desired configuration. The other pincher arm 43 is similarly shaped and includes outwardly extending journal portions 52 and 53 which extend through bushings 54 mounted in openings in the frame plates.

An elongated generally V-shaped pinching bar 53 (FIG. 9) is secured to the central portion of the pincher arm 42, as by welding, and is engageable with a resilient, compressible elongated pad 54 which is car-

ried by the other pincher arm. The pad **54** is press fitted within a channel **55** (FIG. **10**) formed by reversely folding a metal strip **56**, the ends of which are welded to the pincher arm **43**.

The roller-equipped axles **44** and **45** are also journaled in the frame plates **38** and **39** by means of bushings **58** and **59**, respectively. The bushings **59** are mounted within circular openings in the frame plates, but the bushings **58** are mounted within horizontally extending slots **60** (FIG. **5**) to permit the axle **44** to slide toward and away from the axle **45**. A pair of rollers **61** and **62** are mounted on the axle **44** adjacent the frame plates, and a pair of rollers **63** and **64** are mounted on the axle **45** in alignment with the rollers **61** and **62**. The rollers **61–64** are preferably formed of rubber or some other resilient material which has some compressibility and which provides a good gripping surface. A pair of springs **65** and **66** extend between the ends of the axles adjacent the frame plates to resiliently bias the axles and the rollers toward each other.

The pincher arms and the rollers are operated by an elongated foot crank **68** which is secured at about its midpoint to the outer end of the journal portion **50** of the pincher arm **32** by bushing **69**. The bushing **69** is welded to both the foot crank **68** and the journal portion **50** so that rotation of the foot crank will cause rotation of the pincher arm **42**.

The foot crank **68** extends from the bushing **69** generally toward the other pincher arm **43** but at an angle with respect to a line between the journal portions of the pincher arms. The crank includes a camming portion **70** between the pincher arms and a ratchet portion **71** having arcuately disposed teeth **72**. The camming portion **70** provides an upper camming edge **73** which extends slightly angularly with respect to a line between the journal portions **50** and **53**, and which engages a cam follower pin **74** rotatably secured to a generally L-shaped lever arm **75**. The lever arm is secured to the journal portion **53** of the pincher arm **43** by bushing **76**, which is welded to both the journal portion **53** and the lever arm **75** so that rotation of the lever arm causes rotation of the pincher arm **43**.

The teeth **73** of the ratchet portion of the crank arm matingly engage gear wheel **78** which is rotatably received on the axle **45**. Suitable over-running clutch means are provided for the gear so that the gear will drive the axle **45** when the ratchet portion of the foot crank rotates upwardly, but will slip on the axle **45** when the ratchet portion returns downwardly. In the particular embodiment illustrated, a helically wound spring **79** (FIGS. **7** and **8**) is ensleeved on the axle between the gear **78** and a radially enlarged abutment **80** secured to the end of the axle. The end of the spring adjacent the gear **78** is connected to the gear for rotation therewith, and when the gear rotates counterclockwise as viewed in FIG. **4**, the turns of the spring tighten about the axle and rotate the axle with the gear. When the gear is rotated clockwise, the turns of the spring will loosen, and the gear and the spring will slip on the axle.

A second lever arm **82** identical to the lever arm **75** is secured to the other end of the pincher arm **43** by means of bushing **83**. The lever arms **75** and **82** are resiliently biased downwardly by coil springs **84** and **85**, respectively, which are secured to the lever arms and to the casing. The tension exerted by the springs **84** and **85** urge the cam follower pin **74** against the camming edge **71** of the foot crank, and the pincher arms **42** and **43** are thereby resiliently biased toward each other.

Referring to FIGS. **1** and **3**, the front wall **14** of the casing is seen to be provided with a pair of inwardly extending recessed portions **88** and **89**. The foot crank **68** extends through a slot **90** in the recessed portion **88**, and a foot pedal **91** is secured to the outer end of the foot crank. The other recess **89** receives a roll **92** of toilet paper.

The front wall **14** is also provided with a suitable opening to receive drawer **93** which extends from the front wall to the rear wall. The drawer may be provided with a rotatable knob **94** and latch **95** to permit the drawer to be releasably locked within the casing to prevent inadvertent opening thereof.

OPERATION

When the toilet is to be used, the top **18**, toilet seat **16**, and urine deflector **33** are raised to permit access to the collar plate **25**. An elongated accordion pleated or folded plastic tube **30** is then positioned about the collar, and the end of the tube is drawn downwardly through the central opening of the collar into the interior chamber of the casing. If the end of the tube is open, a knob can be tied in the tube before inserting it through the opening.

The foot crank **68** is then depressed by stepping on the pedal **91**, and as the crank rotates counterclockwise as viewed in FIG. **3**, the lever arm **75** will rotate clockwise, and the pincher arms **42** and **43** will rotate away from each other. Also, as the foot pedal is depressed, the ratchet **72** will rotate the gear **78**, the axle **45**, and the rollers **63** and **64** in the counterclockwise direction. While the foot pedal is held in the depressed position indicated in FIGS. **6–8**, the end of the plastic tube is fed downwardly between the separated pincher arms and between the rollers **61–64**. The tube can easily be inserted between the associated pairs **61** and **63**, and **62** and **64** of rollers since the axle **44** may slide in the elongated slots **60** in the frame plates. After the edges of the tube are positioned between each of the associated pairs of rollers, the pedal can be released to bring the pincher arms into clamping engagement with the tube. As shown best in FIG. **3**, the V-shaped pinching bar **53** will force the tube into the compressible pad **54**, and a substantially odor-tight V-shaped seal is thereby provided.

The toilet is then ready for use, and after each use the toilet can be prepared for another use merely by depressing the foot pedal once. As the foot pedal is depressed, the pincher arms **42** and **43** will rotate away from each other, and the rollers **63** and **64** will rotate counterclockwise as viewed in FIG. **3**. The rollers **61** and **62** are biased toward the rollers **63** and **64**, respectively, by the springs **65** and **66** to provide a relatively tight tube-advancing nip therebetween, and counterclockwise rotation of the rollers **63** and **64** will cause clockwise rotation of the rollers **61** and **62**. The tube **30** is thereby drawn downwardly through the nips of the oppositely rotating rollers toward the drawer **93**. The rollers engage the tube at the edges, and the waste material can pass between the associated pairs of rollers. As the tube **30** is drawn downwardly through the

opening in collar plate **25**, the accordion folds of the tube around the outer wall **27** of the collar plate unfold to feed the tube through the opening as needed. When the pedal is released, the pincher arms return to seal the tube while the gear **78** rides freely on the axle **44** and the rollers remain staionary.

Before the pedal is depressed, the cam follower pin **74** is positioned just below a line between the journal portions of the pincher arms, and a substantially vertical force acts upon the pin to rotate the lever arm **75** as the foot pedal is depressed.

From the foregoing it is seen that the operation of the toilet is easily accomplished merely by stepping once on the foot pedal **91**. Until the foot pedal is depressed, the bag is tightly sealed by the pincher arms to substantially prevent the escape of odors from waste material in the bottom of the toilet, and even after the pincher arms are depressed to permit the bag to be drawn downwardly between the rollers, the bag will remain substantially closed. The foot pedal can be quickly depressed and released, and the spring force provided by the springs **84** and **85** return the pincher arms quickly to the sealing position to minimize the escape of odors.

The deflector plate **33** is provided in the event that a person does not wish to urinate with the toilet seat **16** in the down position. The toilet seat can be raised, and the deflector plate **33** will remain in place over the folded tube.

When it is desired to empty the toilet, the tube can be cut above the pincher arms, or the foot pedal can be repeatedly operated until substantially all of the unused bag is fed through the pincher arms. The end of the tube is then tied in a knot, the pedal is depressed to open the pincher arms, and the tube is pushed downwardly between the axles into the drawer **93**. The drawer **93** can then be removed to transport the bag and contents to the disposal site.

In one specific embodiment of the invention, the ratchet **72** was provided with **9** teeth and the gear **78** had **8** teeth. The diameter of the rollers **63** and **64** was about 3 inches, and, since these rollers will make about a three-quarter to about a full revolution during each actuation of the foot pedal, the rollers would advance about 7 to about 9-½ inches of the bag during each cycle.

While in the foregoing specification a detailed description of a specific embodiment of the invention was set forth for the purpose of illustration, it is to be understood that many of the details hereingiven may be varied considerably by those skilled in the art without departing from the spirit and scope of the invention.

I claim

1. An operating mechanism for a portable toilet comprising a frame, a pair of pincher arms, each of the pincher arms having a central pinching portion and a pair of horizontally extending journal portions journaled in said frame at substantially vertically fixed positions for rotation about a horizontal axis whereby the central pincher portions can be rotated toward and away from each other, a pair of generally parallel spaced-apart roller-equipped axles journaled in said frame at substantially vertically fixed positions, the rollers of the axles providing a web-advancing nip, lever means connected to the pincher arms for rotating the central pinching portions of the pincher arms away from each other, means connecting the lever means and one of said axles for rotating the axle when the pincher arms are rotated away from each other whereby a web extending between the pincher arms and the rollers may be advanced by the rollers as the pincher arms are moved away from the web.

2. An operating mechanism for a portable toilet comprising a frame, a pair of pincher arms journaled in said frame for rotation toward and away from each other, each of the pincher arms including a generally U-shaped central portion and a pair of journal portions, a pair of generally parallel spaced-apart roller-equipped axles journaled in the frame, the rollers of the axles providing a web-advancing nip, lever means connected to the pincher arms for rotating the pincher arms away from each other, the lever means including an elongated crank arm secured to one of the journal portions of one of the pincher arms and a crank follower arm secured to one of the journal portions of the other pincher arm, the crank follower arm engaging the crank arm whereby rotation of the crank arm in one direction causes rotation of the crank follower arm in the other direction, means connecting the lever means and one of said axles for rotating the axle when the pincher arms are rotated away from each other whereby a web extending between the pincher arms and the rollers may be advanced by the rollers as the pincher arms are moved away from the web.

3. The mechanism of claim **2** in which the connecting means includes a gear carried by said one axle, the crank arm including an arcuately shaped ratchet portion matingly engageable with the gear whereby rotation of the crank arm causes rotation of said one axle.

4. The mechanism of claim **3** including clutch means operatively connecting said gear and said one axle for causing rotation of said one axle when the gear rotates in one direction but not in the other.

5. The mechanism of claim **3** in which the other axle is journaled in a slot in the frame to permit sliding movement of the other axle toward and away from said one axle and spring means interconnecting the axles for resiliently biasing the axles toward each other.

6. The mechanism of claim **1** including a resilient deformable pad carried by one of the pincher arms for engagement with the other pincher arm.

7. The mechanism of claim **1** including springs connected to the lever means for resiliently biasing the pincher arms toward each other.

8. A portable toilet comprising a casing providing an interior chamber therein, the casing having an upper seat portion with a central opening therein and a lower waste-receiving portion, a pair of generally U-shaped pincher arms within the casing below the central opening, each pincher arm having an elongated central portion extending generally parallel with the central portion of the other pincher arm and a pair of end portions rotatably mounted within the casing, spring means operatively connected to the pincher arms for resiliently biasing the central portions of the pincher arms into engagement with each other, an elongated crank arm secured intermediate the ends thereof to one of the end portions of one of the pincher arms, one end of the crank arm extending through a slot provided in the casing, a lever arm secured to one of the end por-

tions of the other pincher arm and extending toward and engaging the other end of the crank arm whereby rotation of the crank arm in one direction causes rotation of the lever arm in an opposite direction and rotates the pinching arms away from each other, a pair of generally parallel axles rotatably mounted within the casing below the central portions of the pincher arms, a pair of spaced-apart rollers mounted on each axle, spring means interconnecting the axles for resiliently biasing the rollers of each axle into engagement with the rollers of the other axle, and means connecting the crank arm and one of the axles whereby rotation of the crank arm causes rotation of said one axle.

9. The apparatus of claim **8** in which the connecting means includes a gear carried by said one axle, the other end of the crank arm including an arcuately shaped ratchet portion matingly engageable with the gear whereby rotation of the crank arm in one direction causes rotation of said one axle.

10. The apparatus of claim **9** including abutment means on said one axle spaced from the gear and a helically wound spring ensleeved on said one axle between the gear and the abutment means, one end of the spring being connected to the gear for rotation therewith, the gear being rotatably carried by said one axle whereby rotation of the gear with the crank arm in said one direction tightens the helically wound spring against the axle to rotate the axle with the gear and rotation of the gear in the other direction loosens the spring to permit the gear to rotate freely with respect to the axle.

11. The apparatus of claim **8** including an elongated, generally V-shaped pincher bar secured to the central portion of one of the pincher arms and an elongated resilient deformable pad carried by the central portion of the other pincher arm, the pincher bar being engageable with the pad.

12. The apparatus of claim **8** including a spring connected to said lever arm and to the casing for resiliently biasing the lever arm into engagement with the crank arm and thereby resiliently biasing the pincher arms towards each other.

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