

- [54] **SPIN CONTROL FOR CENTRIFUGAL
EXTRACTOR**
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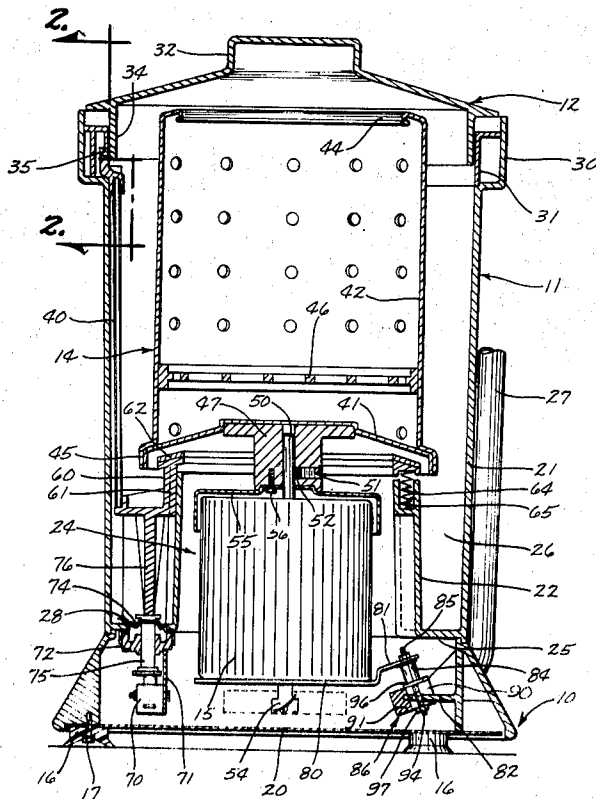
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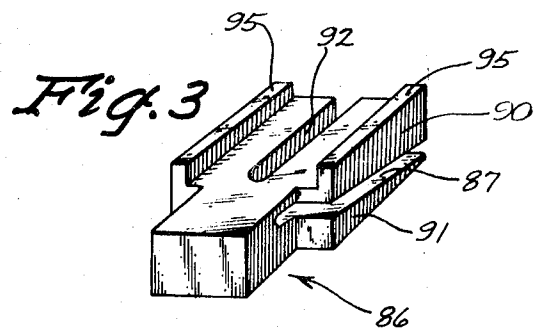
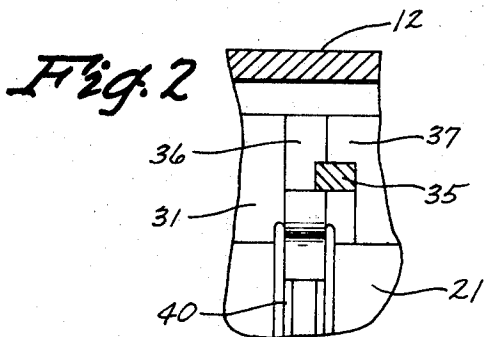
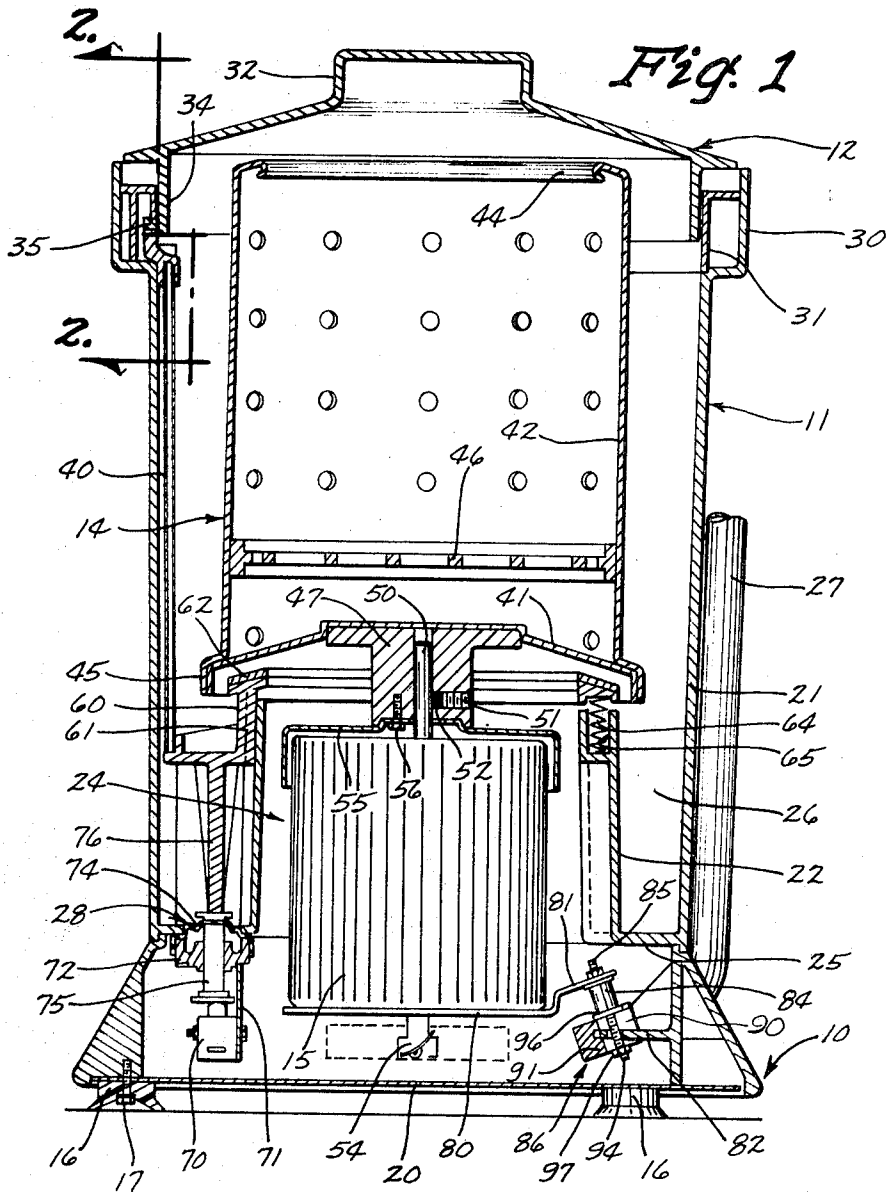
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ABSTRACT

An access lid of a centrifugal extractor is manually movable for interrupting motor energization and for effecting engagement of a brake with a surface of the rotatable fabric container to reduce the speed of the spinning container responsive to initial movement of the lid from an access-closing position.

12 Claims, 3 Drawing Figures





SPIN CONTROL FOR CENTRIFUGAL EXTRACTOR

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to a brake for a centrifugal extractor and more particularly to a brake actuated by a lid and directly engageable with the spinning container to effect a braking thereof.

2. Description of the Prior Art

The nature of a centrifugal extractor dictates, in the interest of safety, that rotation of the spinner or container be controlled to prevent access thereto during high speed rotation. In a centrifugal extractor a container, in this application a fabric container, is driven at relatively high centrifugal speeds to remove liquid from the articles contained in the spinner. Because of the high speed it is of course desirable to prevent an encounter with the spinner or its contents while it is driven at extraction speeds.

Prior art disclosures in the area of centrifugal extractors disclose a number of systems for preventing access to the spinning container. These prior art disclosures, however, include relatively complex intermediate actuating mechanisms and structures for effecting selective clutching and braking of the container. In some prior art disclosures solenoids are selectively energizable for effecting either a driving condition or a braking condition of the motor or related drive system components.

There is thus a continuing search to satisfy the need for a simple low cost yet effective and reliable control system for achieving a braking of the rotation of the spinner prior to permitting access to the spinner.

SUMMARY OF THE INVENTION

It is thus an object of the instant invention to provide an improved control for a centrifugal extractor to insure a braking of the spinner rotation prior to permitting access to the spinner.

It is a further object of the instant invention to provide a reliable low cost manually operable braking system for a centrifugal extractor.

It is still a further object of the instant invention to provide a centrifugal extractor control system including a lid-actuated brake engageable with the rotating spinner to insure a braking thereof prior to permitting access to the spinner.

The instant invention achieves these objects in an extractor having a lid-actuated brake normally engageable with a surface of the spinner and operable to a disengaged position responsive to a predetermined positioning of the lid on the housing.

Operation of the device and further objects and advantages thereof will become evident as the description proceeds and from an examination of the accompanying page of drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

The drawings illustrate a preferred embodiment of the invention with similar numerals referring to similar parts throughout the several views wherein:

FIG. 1 is a sectional view taken generally along the longitudinal vertical axis of a centrifugal extractor embodying the instant invention;

FIG. 2 is a fragmentary sectional view of a portion of the centrifugal extractor as taken generally along lines 2-2 of FIG. 1; and

FIG. 3 is a perspective view of an adjustable support member comprising a portion of the extractor shown in FIG. 1.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to FIG. 1 there is shown a centrifugal extractor electrically energizable for effecting removal of liquid from fabrics. In the embodiment shown in FIG. 1 the extractor is a compact portable apparatus that may be set on a cabinet or counter top for draining extracted liquid into a sink. The extractor includes the major components of a base 10, housing 11, lid 12, centrifugal spinner 14, and motor 15.

More specifically, the exterior construction includes a base 10 supported on a plurality of feet 16 attached to the base by screws 17. The screws 17 and feet 16 cooperate to removably attach a base cover 20 to the lower side of the base 10 for substantially closing the bottom portion of the extractor.

Positioned on the base and attached thereto is a housing 11 for enclosing the spinner 14 and motor 15 and for defining a fluid reservoir. The housing 11 includes a generally cylindrical imperforate outer wall 21 extending upwardly to a height approximating that of the upper portion of the spinner 14. The housing 11 further includes an imperforate truncated wall 22 spaced inwardly from the outer wall 21. The inner wall 22 is spaced from the axis of the extractor to define a motor cavity 24 along the axis of the extractor. A bottom wall 25 connects the inner and outer walls 21 and 22 to form a generally annular fluid reservoir 26. The bottom wall 25 is imperforate except for a first opening (not shown) connected to the drain hose 27, shown in fragmentary form in FIG. 1, that conducts the extracted fluid from the reservoir 26 to an external drain, and a second opening 28 for accommodating switch operating mechanism as will be further described hereinafter.

The housing 11 further includes a radially enlarged upper flange 30 connected to the outer wall 21 and defining an access into the housing 11. The upper flange 30 receives an internal annular rim 31 that encircles the access. Though the apparatus is portable, the housing 11 and base 10 may be considered as generally stationary housing means.

The lid 12 has a shallow conical shape extending inwardly and upwardly to a central upwardly extending handgrip 32. A depending flange 34 adjacent the outer periphery of the lid 12 telescopes into the annular rim 31 for effectively closing the access opening. The lid 12 further includes a plurality of lugs 35 extending radially outwardly from the depending flange 34 and, as shown in FIG. 2, mate with vertical slots 36 in the rim 31.

At a predetermined vertical orientation of the lugs 35 in the vertical slot 36 the lid 12 is rotatable to effect a detent-type engagement of the lug 35 with a shoulder 37 in the annular rim 31 to effectively retain the lid 12 in an operative condition. Movement of the lid 12 downwardly in the slot 36 also effects engagement of the lug 35 with the upper end of an actuating rod 40 that extends downwardly into the fluid reservoir 26 for effecting a control function. Movement of the lid 12 to the detent position, as shown in FIGS. 1 and 2, effectively locks the actuator rod 40 in an operative position.

The spinner or fabric container 14 is disposed for rotation on generally the central axis of the housing 11. The spinner 14 includes an imperforate bottom wall 41 and a perforate generally cylindrical upwardly extending outer wall 42 connected to the bottom wall 41 at its lower end and terminating in an inwardly extending rolled flange 44 at the upper end to form a container for the fabrics. The access of the spinner 14 is defined by the upper flange 44 and is readily convenient for the loading of fabrics into the spinner 14. The lower portion of the sidewall 42 is offset radially outwardly and formed to an outer downwardly extending flange of the bottom wall 41 to form a fluid deflecting flange 45 for directing fluid from the spinner 14 into the fluid reservoir 26. The deflecting flange 45 thus effectively prevents the flow of liquid into the motor compartment 24.

Disposed within the spinner 14 is a grid-like perforate fabric retainer 46. The flexible fabric retainer 46 is placed in the spinner 14 after the clothes have been loaded for retaining the fabric in a lower portion of the spinner during centrifugal operation thereof.

The bottom wall 41 of the spinner 14 is attached to a flanged hub 47 that is in turn connected to the motor shaft 50 by a urethane plug 52 and setscrew 51. The motor 15 is positioned within the compartment 24 defined by the inner housing wall 22 on the generally central axis of the extractor. The shaded pole fractional horsepower motor 15 is operable for rotation at approximately 3,500 rpm to effect rotation of the spinner 14 at extraction speeds. Disposed below and driven by the motor 15 is a fan 54 for effectively cooling the motor 15 during extractor operation. An imperforate motor shield 55 is disposed above the motor 15 and connected to the hub 47 by a plurality of screws 56.

A brake system is disposed generally between the bottom of the spinner 14 and the motor 15. The brake system includes an annular frame 60 effectively keyed to the inner housing wall 22 by a plurality of mating splines 61 disposed around the inner surface of the annular brake frame 60 and the outer periphery of the inner wall 22 for permitting axial movement of the brake frame 60 while preventing rotation movement of the brake frame 60 relative to the housing 11. The brake system includes a brake pad 62 fixed to the brake frame 60 and engageable with the bottom wall 41 of the spinner 14. The brake frame 60 is biased axially upwardly for engagement of the brake pad 62 with the bottom wall 41 of the spinner 14 by a plurality of springs 64 angularly spaced around the brake frame 60. Each spring 64 is positioned in a cavity 65 defined by the inner housing wall 22 and is operable on the brake frame 60 for normally effecting engagement of the brake pad 62 with the surface of the bottom wall 41.

As previously indicated, movement of the brake frame 60 is controlled by the lid 12 through the lid lugs 35 and actuating rods 40. In the preferred embodiment, three actuating rods 40 and three springs 64 are operable on the brake frame 60 to control positioning thereof relative to the housing 11 and the spinner 14. Movement of the lid 12 to the access-closing position shown in FIG. 1 operates through the actuating rods 40 to depress the brake frame 60 for spacing the brake pad 62 from the spinner bottom wall 41 and permitting operation of the spinner 14 upon energization of the motor 15.

The motor 15 is connected to an electrical circuit for selective energization thereof to effect operation of the

extractor. Included in the circuit is a control switch 70 positioned within the base 10 and mounted to the housing 11 through a bracket 71 fixed to the underside of the housing bottom wall 25. The bracket 71 also supports a plunger guide 72 that in turn clamps an aperture-closing seal 74 between the guide 72 and the housing bottom wall 25.

The switch 70 is operable from a normally open condition to a closed condition responsive to downward movement of a plunger 75 slidably operable in the guide 72. The upper end of the plunger 75 extends through the aperture-closing seal 74 in the lower housing wall 25 and is engaged by a depending arm 76 of the brake frame 60 for movement of the plunger 75 and operation of the switch 70 to the closed condition when the lid 12 is positioned for disengaging the brake and effecting operation of the extractor as in FIG. 1. When the lid 12 is moved from the operative position, the brake springs 64 move the brake pad 62 into engagement with the spinner 14 and permit operation of the switch 70 to the normally open condition.

The lower end of the motor 15 is fixed to a support plate 80 by threaded fasteners (not shown). This support plate 80 includes a plurality of radially extending arms 81 angularly spaced around the support plate 80 and juxtaposed to similarly spaced brackets 82 formed as part of and extending inwardly from the base 10.

Operatively disposed between each of the overlapping support plate arms 81 and base brackets 82 is a resilient member 84. A nut and bolt at 85 connects one end of the resilient member 84 to the operating assembly through the support plate arm 81. The other end of the resilient member 80 is connected to the housing bracket 82 through an adjustable member 86. The adjustable member 86 is best shown in the perspective view of FIG. 3 and is selectively movable relative to the bracket 82 to effect an adjustment of the orientation of the operating assembly relative to the housing 11.

The adjustable member 86 is basically a rectangular block with a generally diagonally oriented slot 87 partially cut into the block to essentially provide a first wedge-shaped member 90 for disposition between the resilient member 84 and the bracket 82 and a connected second wedge-shaped member 91. The diagonal slot 87 extends from the rear of the member 86, as in FIG. 3, to receive the bracket 82 and to position the second wedge-shaped portion 91 therebelow. The adjustable member 86 further includes a recess 92 that accommodates the connecting bolt 94 extending downwardly from the resilient member 84. The shoulders 95 on the upper side of the adjustable member 86 receive the generally square lower plate 96 of the resilient member 84 and prevent its turning when a nut 97 is tightened onto the bolt 94. As best shown in FIG. 1 the adjustable member 86 is thus horizontally movable in a generally radial direction on the bracket 82 to move the first wedge-shaped portion 90 relative to the housing 11 and operating assembly for effecting a change in the elevation of the supporting plate arm 81 to thereby alter the orientation of the operating assembly relative to the housing 11.

It is seen that as the adjustable member 86 is moved horizontally to reposition the first wedge-shaped portion 90, the operating length of the connecting bolt 94 remains substantially constant because of the second wedge-shaped portion 91 so that adjustment and tightening of the nut 97 to the bolt 94 is simplified and the

requirement for an extended length adjustment bolt as used in prior art is avoided.

It is clear that this arrangement will permit raising and lowering of the operating assembly by changing all of the mounts and will permit centering of the operating assembly by changing one or more of the mounts by moving the wedge-shaped portion 90 relative to the bracket 82.

Initiation of extractor operation following the placing of fabrics in the spinner 14, as previously indicated, is controlled by the operator. The operator aligns the lug 35 on the lid 12 with the vertical slot 36 and pushes the lid 12 downwardly in an axial direction against the biasing force of the springs 64 to move the lug 35 through the vertical slot 36. Upon overcoming the biasing force of the springs 64, the vertical movement of the lid 12 effects a downward movement of the actuating rod 40 for moving the brake pad 62 out of engagement with the spinner 14. The terminal movement of the brake frame 60 actuates the switch 70 to the closed position for energizing the motor 15. The lid 12 is then rotated a short angular distance to move the lug 35 into engagement with the shoulder 37 of the annular rim 31 to effectively latch the lid 12 into an operative position. The brake is thus released and the motor 15 is energized for effecting rotation of the spinner 14 to provide a centrifugal fluid extraction operation.

To stop the extractor and obtain access to the spinner 14 the process is essentially reversed to effect deenergization of the motor 15 and a braking of the spinner 14. More specifically, the operator first rotates the lid 12 a short distance to release the detent and align the lug 35 with the vertical slot 36. The biasing force provided by the brake springs 64 will move the brake frame 60 in an upwardly direction to effect braking engagement of the brake pad 62 with the spinner bottom wall 41 and through the actuating rods 40 will move the lid 12 upwardly to a rest position if released by the operator. The braking engagement of the brake pad 62 with the spinner 14 brakes or decreases the rotational speed of the spinner 14 through a frictional action between the bottom wall 41 of the spinner 14 and the brake pad surface. The initial movement of the brake frame 60 from the operative position deenergizes the motor 15.

The brake system forming the preferred embodiment of this invention is operable for achieving a braking of the spinner 14 from approximately 3,500 rpm to a stop condition in approximately 2 or 3 seconds. Access to a centrifugally rotating spinner is thus effectively prevented by this brake system.

It is thus clear that the instant invention provides an uncomplicated low cost yet highly effective and reliable braking system. Operation of the switch for deenergizing the motor and the engagement of the braking surfaces during removal of the lid effectively prevent access to the container while it is centrifugally rotating.

The invention disclosed herein is related to and disclosed in an application entitled "Supporting System for Centrifugal Extractor" filed by Edward O. McCartney as Ser. No. 202,795 on Nov. 29, 1971 and assigned to the assignee of the instant invention.

In the drawings and specification there is set forth a preferred embodiment of the invention and although specific terms are employed these are used in a generic and descriptive sense only and not for purposes of limitation. Changes in form and the proportion of parts as

well as the substitution of equivalents are contemplated as circumstances may suggest or render expedient without departing from the spirit or scope of this invention and defined in the following claims.

I claim:

1. In an extractor, the combination comprising: a rotatable container operable at extraction speeds for removing liquid from articles contained therein; drive means for rotating said container; control means controlling said drive means to selectively effect rotation of said container; a housing defining a chamber for receiving said container and defining an opening for access to said container; a movable lid disposed in said opening; brake means disposed at least partially within said chamber for engagement with a wall of said container; biasing means for effecting engagement of said brake means with said container wall; and means operably connecting said lid to said control means and said brake means and responsive to movement of said lid to a predetermined access-closing position for overcoming said biasing means to disengage said brake means from said container wall and for actuating said control means to effect operation of said drive means whereby movement of said lid to said access-closing position initiates rotation of said container.

2. In an extractor as defined in claim 1 wherein said control means includes switch means for controlling energization of said drive means and responsive to movement of said lid to said predetermined access-closing position for actuating said switch means to energize said drive means.

3. In an extractor as defined in claim 1 wherein said brake means is spaced from said lid and is juxtaposed to the bottom wall of said container for engagement therewith.

4. In an extractor as defined in claim 1 wherein said brake means is generally annular and is associated with said housing through a splined connection for axial movement relative thereto between positions of engagement and disengagement with said container wall.

5. In an extractor, the combination comprising: a rotatable container operable at extraction speeds for removing liquid from articles contained therein; drive means for rotating said container; switch means controlling energization of said drive means; a housing defining a chamber for receiving said container and defining an opening for access to said container; a movable lid disposed in said opening; actuating means operatively disposed between said lid and said switch means and operable for actuating said switch means responsive to movement of said lid; brake means engageable with a wall of said container, said brake means including an annular member axially movable relative to said housing between positions of engagement and disengagement with said container wall; biasing means for effecting engagement of said brake means with said container wall; and means associated with said actuating means for operably connecting said lid to said brake means, movement of said lid to a predetermined access-closing position being operable for actuating said switch means to energize said drive means and for overcoming said biasing means to disengage said brake means from said container wall whereby movement of said lid to said access-closing position initiates rotation of said container.

6. In an extractor as defined in claim 5 and further including means responsive to generally rotational

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movement of said lid with said lid in the predetermined access-closing position for effectively latching said lid to said housing while said extractor is operating.

7. In an extractor as defined in claim 5 and wherein said annular brake means is splined to a portion of said housing for axial movement relative thereto between positions of engagement and disengagement with the bottom wall of said container.

8. In an extractor as defined in claim 5 wherein said connecting means disposed within said chamber is operable for effecting disengagement of said brake means from said container wall responsive to an axial movement of said lid to said access-closing position and wherein said actuating means is operable for effecting actuation of said switch means responsive to the same axial movement of said lid.

9. In an extractor, the combination comprising: a rotatable container operable at extraction speeds for removing liquid from articles contained therein; drive means for rotating said container; switch means controlling energization of said drive means; a housing generally enclosing said container and defining an opening for access to said container; a removable lid disposed in said opening and axially movable relative to said housing to an access-closing position; brake means for stopping rotation of said container; biasing means for effecting operative engagement of said brake means; means operably connecting said lid to said switch

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means and said brake means and responsive to axial movement of said lid to said access-closing position for actuating said switch means to energize said drive means and for overcoming said biasing means to operatively disengage said brake means whereby movement of said lid to said access-closing position initiates rotation of said container; and interlocking means operatively engageable upon rotational movement of said lid in said access-closing position for effectively latching said lid to said housing while disengagement of said brake means and actuation of said switch means effect rotation of said container.

10. In an extractor as defined in claim 9 wherein said lid and said brake means are generally annular and wherein an axially applied force of said lid is transmitted to the brake means for effecting said operative disengagement thereof.

11. In an extractor as defined in claim 9 wherein said brake means is directly engageable with a wall of said container for stopping rotation of said container.

12. In an extractor as defined in claim 11 wherein said brake means is generally annular and splined to a portion of said housing and wherein biasing means is disposed between said brake means and said housing to normally maintain said brake means in braking engagement with said container.

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