

- [54] SAFETY DEVICE FOR BACON PRESS
[75] Inventors: Jeffrey P. Christensen, Clarkston, Ga.; Larry E. Helsene, Austin, Minn.
[73] Assignee: Geo. A. Hormel & Co., Austin, Minn.
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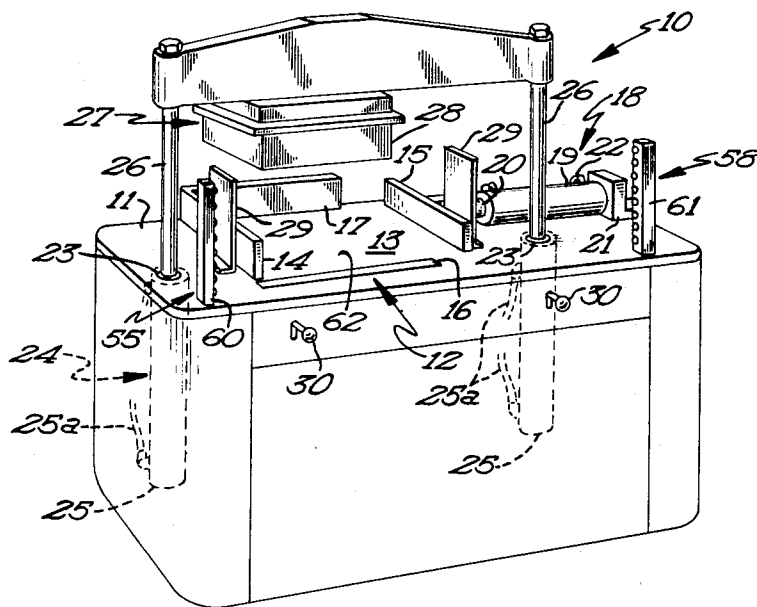
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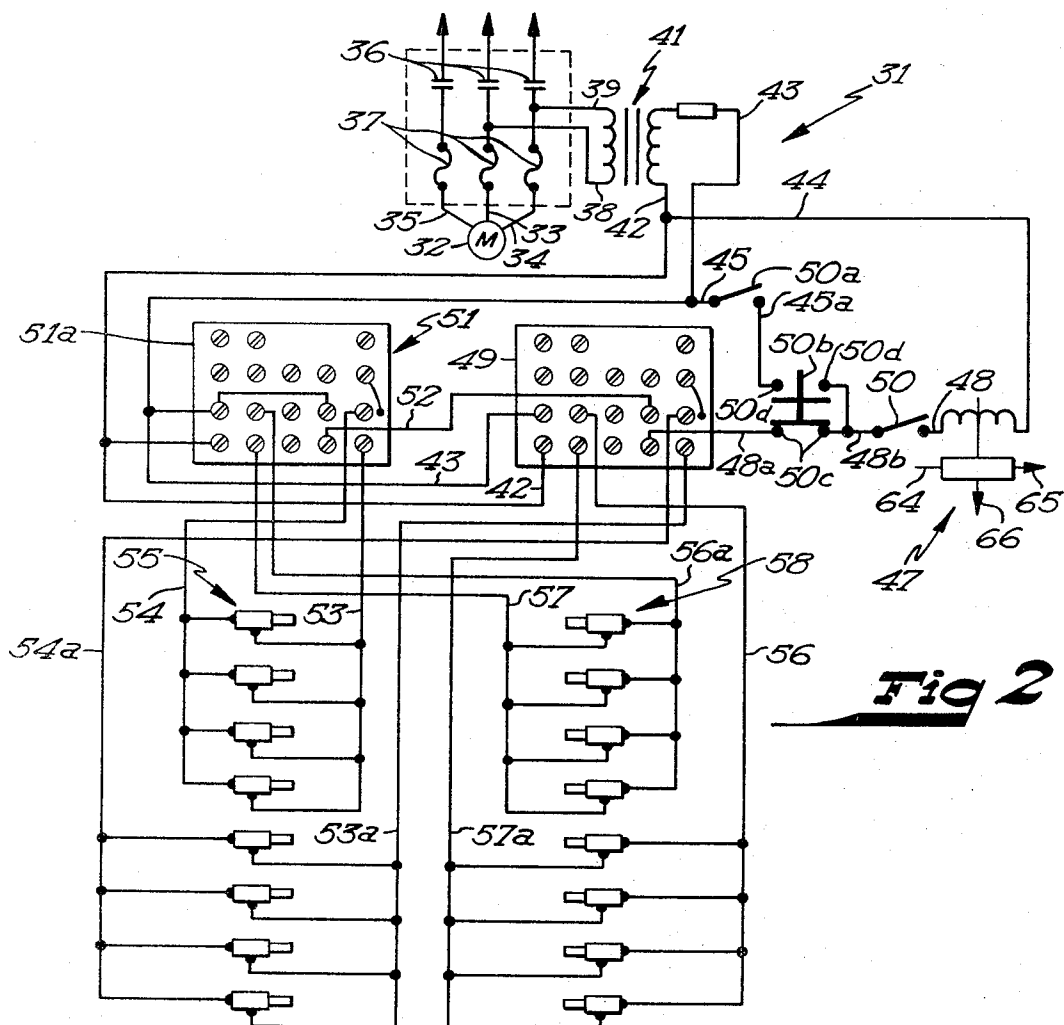
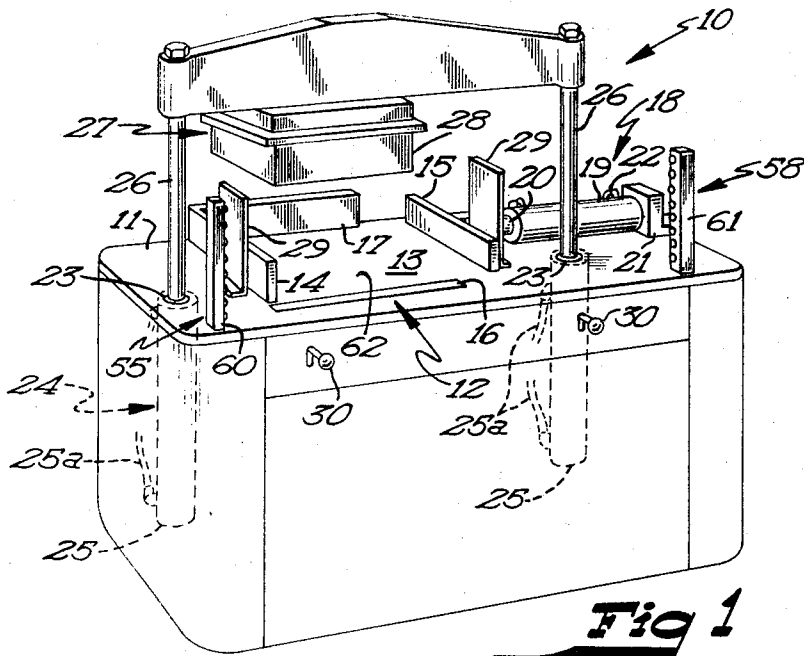
Primary Examiner—Walter Stolwein
Attorney, Agent, or Firm—Williamson, Bains & Moore

[57] ABSTRACT

A bacon press includes a mold in which a slab of bacon to be molded is compressed laterally and vertically by hydraulic rams. An operating circuit operates a solenoid valve in the hydraulic system which controls operation of the hydraulic rams. A photoelectric cell control circuit is normally interconnected in circuit controlling relation with respect to the operating circuit and de-energizes the operating circuit if there is an obstruction in a space located generally in the access zone to the mold. The operation of the hydraulic rams will be instantaneously stopped in the event that the operator's hands or any other obstructions are disposed in the path of the ram or even adjacent the area of the bacon press mold.

3 Claims, 2 Drawing Figures





SAFETY DEVICE FOR BACON PRESS

SUMMARY OF THE INVENTION

This invention relates to a bacon press and more specifically to a safety device for a bacon press.

It is a general object of this invention to provide a bacon press with a safety device to minimize, if not eliminate any chance of injury to an operator during operation of the bacon press.

More specifically, it is an object of this invention to provide a bacon press with a photoelectric cell control circuit, which is operable to instantly interrupt operation of the hydraulic rams of the press in the event that any obstruction, such as an operator's hands are located in the access zone to the bacon press mold. With this arrangement, the press will be instantaneously stopped even if the operator's hands are merely located in the area adjacent the bacon press mold so there is no danger of the operator being injured by his negligence during operation of the bacon press. The control circuit is also operable to prevent operation of the bacon press in the event that there is a malfunction in the photoelectric cell control circuit.

These and other objects and advantages of this invention will more fully appear from the following description made in connection with the accompanying drawings wherein like reference characters refer to the same or similar parts throughout the several view.

FIGURES OF THE DRAWINGS

FIG. 1 is a perspective view of a bacon press incorporating the novel safety device, and

FIG. 2 is a diagrammatic view illustrating the circuitry used in the operation of the bacon press.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now to the drawing and more specifically to FIG. 1, it will be seen that one embodiment of the bacon press apparatus, designated generally by the reference numeral 10 is there shown. The bacon press apparatus 10 includes a generally rectangular shaped base or frame 11 having a bacon press mold 12 located on the upper surface thereof. The mold 12 is comprised of a bottom wall 13, a fixed side wall 14, a movable side wall 15, a vertically shiftable front wall 16 and a rear wall 17. Although not shown in the drawing, the front wall 16 of the mold 12 is vertically shiftable to facilitate loading of the slab of bacon to be molded. In this respect, the bacon press is preferably the type manufactured by Albright-Nell Co., and referred to in the trade as the "ANCO Bacon Press."

The slab of bacon is compressed horizontally and vertically during the molding operation and the means for applying horizontal compression comprises a horizontal hydraulic ram 18. The hydraulic ram 18 is a double-acting-type and includes a cylinder 19 having a piston therein which is connected to a piston rod 20. The outer end of piston rod 20 fixedly connects to the movable side wall 15 which is moved into compressing relation with a slab of bacon in the mold when the piston rod is extended. When the piston rod 20 is retracted, the wall 15 will be retracted to open the mold laterally. The cylinder 19 is mounted on a bracket 21 which in turn is mounted on the upper surface of the base 11.

Suitable hydraulic lines 22 interconnect the cylinder 19 to a source of hydraulic fluid under pressure.

The means for applying vertical compression to the slab of bacon in the mold includes a pair of vertical hydraulic rams 24 which are mounted within the base 11 and which are of the double-acting-type, each including a cylinder 25. Each cylinder 25 is connected by suitable hydraulic lines 25a to the source of hydraulic liquid under pressure and each cylinder has a piston movable therein to which is connected a piston rod 26 which projects through guides 23 mounted on the upper wall of the base. The upper ends of the piston rods 26 are each connected to one end of an elongate press head 27 which is vertically shiftable during operation of the bacon press 10. The press head 27 has a substantially rectangular shaped press plate 28 fixedly connected thereto, the press plate 28 having a substantially flat lower surface. It will be seen that when the vertical hydraulic rams 24 are retracted, the press plate 28 will be urged downwardly into compressing relation with respect to a slab of bacon within the mold 12. During a molding cycle, the horizontal hydraulic ram 18 is extended initially to first laterally compress the slab of bacon to be molded and thereafter the vertical rams are retracted to apply vertical compression to the slab of bacon.

The bacon press 12 is also provided with a pair of substantially flat vertical guard plates 29 each being positioned on opposite sides of the mold 12 and adjacent the front wall 16 thereof. A pair of actuator levers 30 are mounted on the front wall of the base and are laterally spaced apart a distance sufficient to require an operator to use both hands in shifting the levers between an operative and inoperative position. Both levers must be simultaneously held in the operative position. Although the use of two actuator handles was intended as a safety measure by requiring an operator to use his hands for shifting the levers during the molding cycle, it is a common practice for some operators to hold one of the actuator levers in the operative position with their body or legs and to hold the other handle in the operative position with one hand, thereby leaving the other hand free. The present safety device serves to interrupt operation of the bacon press if there is any obstruction in the access zone to the mold 12.

In this respect, means are provided for operating the hydraulic ram and this means includes an operating circuit 31 which is comprised of an electric motor pump unit 32 which is adapted to circulate the hydraulic fluid through the hydraulic system. Electrical conductors 33 and 34 interconnect the terminals of the motor pump unit 32 to a source of electrical current and another conductor 35 serves as a ground for the motor pump unit. Each conductor 33 and 34 and 35, is also connected in a series to one of a plurality of capacitors 36. The conductor 33 is connected to one terminal of the primary winding of a stepdown transformer 41 by a conductor 38, while conductor 34 is connected to the other terminal of the primary winding of the stepdown transformer 41 by conductor 39. The terminals of the secondary winding of the step-down transformer 41 are connected to conductors 42 and 43. Conductor 42 is connected to one terminal of a solenoid valve 47 by a conductor 44 while conductors 42 and 43 are connected to suitable terminals of a junction block 49.

Conductor 43 is connected to one of the terminals of a switch 50a, the other terminal of the switch 50a is

connected by a conductor 45a to one terminal of a set of terminals 50d of a switch 50b. An electrical conductor 48a is interconnected to one terminal of another set of terminals 50c of the switch 50b. The other terminal 50c of switch 51b is connected by a conductor 48b to one terminal of a switch 50 and to one of the terminals 50d of switch 50b. The other terminal of switch 50 is connected by a conductor 48 to a terminal of the solenoid valve 47. It is also pointed out that one of the actuating levers 30 is connected to the switch 50 and the other actuating lever is connected to the switch 50a and each of these switches which are normally open are moved to the closed position when the actuating levers are moved to the operative position.

A photo cell control circuit is also provided and is designated generally by the numeral 51 and includes a junction block 51a and a junction block 49. These two junction blocks actually constitute a control chassis and an integrated circuit including a logic module manufactured by Farmers Electric Company and sold in the trade as Model TRB Control Chassis. The integrated circuits also include a normally open relay switch.

Since the details of construction of the integrated circuits are commercially available, it is thought that those circuit details are unnecessary for the present invention. It will be noted that a conductor 52 interconnects a terminal of the junction block 51a with a terminal of the junction block 49. The terminals of a first set of photoelectric cell light receiving components 55 are connected in parallel by conductors 53 and 54 to certain terminals of the junction block 51a. The respective terminals of a second set of photoelectric cells 55 are also connected in parallel by means of conductors 53a and 54a to certain terminals of the junction block 49.

The terminals of a first set of infrared light producing components 58 are respectively connected in parallel by conductors 56 and 57a to certain terminals of the junction block 49. Similarly, the respective terminals of the second group of infrared light producing components 58 are connected in parallel by electrical conductors 56a and 57 to certain terminals of the junction block 51a.

It will be noted that each light producing component is disposed in opposed spaced relation with respect to one of the light receiving components 55. In this respect, it will be noted that each light receiving component 55 is mounted on a vertical post 60 which is affixed to the base 11 and spaced forwardly and laterally of the mold 12. Each of the light producing components 58 is mounted on a post 61 which is also affixed to the base 11 and is spaced forwardly and laterally of the mold 12. It will be noted that the banks of light receiving and light producing components extends vertically beyond the upper confines of the mold 12 and actually projects upwardly beyond the press plate 28 when the latter is in its upward retracted position.

The photoelectric light producing and light receiving components are disposed on opposite sides of and cover the vertical extent of the entire access zone designated generally by the reference numeral 62, to the mold 12. The control circuits 51 will be de-energized if the light source to any of the light receiving components 55 is obstructed and when the control circuit is deenergized, the operation of the hydraulic rams is instantaneously stopped. In practice, the banks of photoelectric cell components are located approximately six

inches forwardly of the mold and extend vertically from the mold upwardly beyond the press plate 28 when the latter is in the fully retracted upper position.

During the operation of the bacon press, the switch 50b will be shifted to an automatic position to close the contacts 50c thereof, while the contacts 50d thereof will be opened. When switch 50b is in this automatic position, the photoelectric cell control circuit will be interrelated in circuit controlling relation with respect to the operating circuit 31. The front wall 16 of the mold 12 will be in a lowered retracted position and the horizontal hydraulic ram 18 will be in a retracted position. The vertical rams will be in an extended position thereby retracting the vertical press head and press plate.

An operator will place a slab of bacon to be molded into the mold 12 and will thereafter simultaneously shift and hold both the control levers in the operative position. When this occurs, the switch 50 and the switch 50a will be closed. It is pointed out that the motor circuit for controlling the motor unit will be continuously energized so that the motor pump unit operates continuously regardless if control levers 30 are in operative position. The photoelectric cell control circuit is adapted to operate in the light mode so that the control and operating circuits will be energized when light from the light producing elements 58 is transmitted to all of the light receiving components. When all of the light receiving components are receiving light from their associated light producing components, the normally open relay of the control circuit will be energized and closed so that when the levers 30 are shifted to the operative position, the operating circuit will be energized. Again, it is pointed out that if there is a malfunction in the control circuit, or if any of the light receiving components 55 fail to receive light from the associated light producing component, then the control circuit will be de-energized and will de-energize the operating circuit. Assuming that the operating circuit is energized, the solenoid of the solenoid valve 47 will be energized and will allow the hydraulic rams to be operated through a compression cycle.

In this respect, the solenoid valve 47 is a three-way two-position valve which is connected by conduit 64 to a source of hydraulic fluid under pressure. The conduit 64 will be intercommunicated with the conduit 65 when the solenoid is energized and when this condition occurs, the hydraulic rams will be actuated. When the solenoid is de-energized, the conduit 64 will be intercommunicated with the conduit 66 which returns or vents the hydraulic fluid to the reservoir of pump.

At the beginning of the compression cycle and after vertical wall 16 has been elevated, the horizontal ram 18 will be extended. When this occurs, the slab of bacon to be compressed will be compressed laterally since the movable wall 15 will be urged against the side of the confined slab of bacon. Thereafter, the vertical rams 24 will be actuated to retract the same and to shift the press head and press plate downwardly against the slab of bacon in the mold and to compress the slab vertically. The horizontal hydraulic ram will be retracted, thus opening the mold laterally and the vertical hydraulic rams will be extended, thus retracting the vertical press head and press plates. The vertical front wall 16 will be retracted thus completely opening the mold for removal of the shaped slab of bacon.

During this operation, it is necessary to hold the actuating levers 30 in the operative position throughout the cycle. In the event that an operator inadvertently moves his hand into the access zone 62 to the mold, at least one or more of the photoelectric cell components will be interrupted and this will instantaneously interrupt operation of the rams. With this arrangement, there is absolutely no danger whatsoever that an operator can be injured by inadvertently placing his hands in the path of the vertical press. In order to do this, the operator must penetrate the access zone and when the control circuit is in an energized condition, such penetration would immediately de-energize the control circuit and the operating circuit.

In the event that the control circuit 51 malfunctions, the operator may still operate the bacon press apparatus by shifting the switch 50b to the manual position so that contacts 50d are closed and contacts 50c are opened. The control circuit will be by-passed and the operating circuit may be operated by shifting the actuating handles 30 to the operative position.

From the foregoing description, it will be seen that I have provided a novel safety system for bacon presses, which is highly effective in minimizing if not completely eliminating injury to an operator as a result of negligence or inadvertence.

It will also be seen that my novel safety device may be readily incorporated on many existing types of bacon presses without requiring material alterations to the presses.

Thus it will be seen that I have provided a novel safety system for bacon presses, which is not only of simple and inexpensive construction, but one which functions in a more efficient manner than any heretofore known comparable device.

What is claimed is:

1. A bacon press for molding slabs of bacon into pre-selected shapes,

a base,

a generally rectangular-shaped mold for receiving therein a bacon slab to be molded and including a bottom, opposed vertical front and rear walls, and opposed vertical side walls, at least one of said vertical side walls being shiftable relative to the other vertical walls between extended compressing position and a retracted open position for applying lateral compression to the bacon slab,

a horizontal ram connected to said one vertical wall and being extensible and retractable to move said one vertical wall between said compressing and retracting positions,

a vertically shiftable ram shiftable between elevated retracted and lowered compressing portions, said vertical ram having a lower surface engageable with the slab of bacon within the mold to vertically compress the same, when the ram is shifted to the lowered compressing position,

an operating circuit connected to a source of electrical current,

an electrically operated control valve in said operating circuit and controlling sequential operation of said vertical and horizontal rams, said operating circuit and control valve serving to cause said horizontal ram to be extended to first laterally compress the bacon, and thereafter causing said vertical ram to be extended to then vertically compress the bacon slab,

a photoelectric control circuit connected to said operating circuit and including a plurality of vertically spaced apart light receiving components mounted on said base and spaced forwardly and laterally of said mold, a plurality of vertically spaced apart light producing components disposed in spaced opposed relation to said light receiving components and mounted on said base and forwardly and laterally of said mold, said light receiving and light producing components extending vertically from said base upwardly beyond the lower surface of the vertical ram when the latter is in the retracted position and being automatically operable to open said control circuit and operating circuit when an obstruction obstructs the passage of light to any of said light receiving components to thereby instantly stop operation of said vertical ram.

2. A bacon press for molding slabs of bacon into pre-selected shapes,

a base,

a generally rectangular-shaped mold for receiving therein a bacon slab to be molded and including a bottom, opposed vertical front and rear walls, and opposed vertical side walls, at least one of said vertical side walls being shiftable relative to the other vertical walls between extended compressing position and a retracted open position for applying lateral compression to the bacon slab,

a horizontal ram connected to said one vertical wall and being extensible and retractable to move said one vertical wall between said compressing and retracting positions,

a vertically shiftable ram shiftable between elevated retracted and lowered compressing portions, said vertical ram having a lower surface engageable with the slab of bacon within the mold to vertically compress the same, when the ram is shifted to the lowered compressing position,

an operating circuit connected to a source of electrical current,

an electrically operated control valve in said operating circuit and controlling operation of said vertical and horizontal rams,

a photoelectric control circuit connected to said operating circuit and including a plurality of vertically spaced apart light receiving components mounted on said base and spaced forwardly and laterally of said mold, a plurality of vertically spaced apart light producing components disposed in spaced opposed relation to said light receiving components and mounted on said base and forwardly and laterally of said mold, said light receiving and light producing components extending vertically from said base upwardly beyond the lower surface of the vertical ram when the latter is in the retracted position and being automatically operable to open said control circuit and operating circuit when an obstruction obstructs the passage of light to any of said light receiving components to thereby instantly stop operation of said vertical ram,

and a pair of spaced apart activating levers on said press, each being shiftable between operable and inoperable positions, said operating circuit being energized only when both of said levers are in the operable position and being de-energized when either of said levers are in the inoperable position, the spacing between the levers being of a magni-

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tude to require an operator to use both hands when simultaneously closing the levers.

3. A bacon press for molding slabs of bacon into pre-selected shapes,

a base,

a generally rectangular-shaped mold for receiving therein a bacon slab to be molded and including a bottom, opposed vertical front and rear walls, and opposed vertical side walls, at least one of said vertical side walls being shiftable relative to the other vertical walls between extended compressing position and a retracted open position for applying lateral compression to the bacon slab,

a horizontal ram connected to said one vertical wall and being extensible and retractable to move said one vertical wall between said compressing and retracting positions,

a vertically shiftable ram shiftable between elevated retracted and lowered compressing portions, said vertical ram having a lower surface engageable with the slab of bacon within the mold to vertically compress the same, when the ram is shifted to the lowered compressing position,

an operating circuit connected to a source of electrical current,

an electrically operated control valve in said operating circuit and controlling operation of said vertical and horizontal rams,

a photoelectric control circuit connected to said op-

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erating circuit and including a plurality of vertically spaced apart light receiving components mounted on said base and spaced forwardly and laterally of said mold, a plurality of vertically spaced apart light producing components disposed in spaced opposed relation to said light receiving components and mounted on said base and forwardly and laterally of said mold, said light receiving and light producing components extending vertically from said base upwardly beyond the lower surface of the vertical ram when the latter is in the retracted position and being automatically operable to open said control circuit and operating circuit when an obstruction obstructs the passage of light to any of said light receiving components to thereby instantly stop operation of said vertical ram,

and a control switch disposed in circuit controlling relation with said photoelectric cell control circuit and being shiftable between manual and automatic positions, said control switch when shifted to the automatic position electrically interrelating said photoelectric cell control circuit with said operating circuit, and when shifted to the manual position, permitting said operating circuit to control operation of said rams when both of said levers are in the operable position while rendering said photoelectric cell control circuit inoperative.

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