

## WEARABLE BELT MESSAGE APPARATUS

### TECHNICAL FIELD

The present invention relates to a wearable belt message apparatus of which surfaces are covered with a woven material and which is wearable on a user's neck or shoulder, and in particular to a wearable belt message apparatus which makes it possible to efficiently massage a user's body with the helps of a built-in vibrator equipped with a solenoid.

### BACKGROUND ART

A vibrator is widely used in a variety of industries. In particular, the vibrator can be adapted to a massage apparatus, a massage bed, a chair, a belt or a mat.

The conventional massage apparatus, which is basically designed to massage a user's neck or back, is configured in a rod shape by means of which a user can massage his/her neck or back while easily holding with hands.

Since the conventional massage apparatus is relatively heavy due to its weight, a lot of weight is transferred to a user's hands or arm during a massaging procedure. The conventional belt message apparatus made of a woven material has a lot of disadvantages for properly massaging and

stimulating a user's neck due to its inherent configuration.

As one of representative methods in a massage apparatus, there is a method which uses a solenoid. A piston works by means of an electromagnetic force generated by a solenoid.

5 In more detail, a conventional vibrator includes a solenoid body having a hollow part, a piston which reciprocates upward and downward with the helps of an electromagnetic force generated from the solenoid, and a spring which is connected with the piston in an upper side or a lower side of the piston while providing the piston with an electromagnetic force and preventing an escape of  
10 the piston.

Figures 1 and 2 are views illustrating the operations of a vibrator which uses a solenoid vibration method. An electromagnetic force coil 14 is wound on a bobbin 12 of the solenoid body 1, and the piston 20 is installed in a hollow part formed in the interior of the body in order for the piston to have a suction  
15 force by means of an electromagnetic force generated by the solenoid 16.

A spring 30 is installed at a lower end of the piston 20 for elastically supporting the piston while preventing an escape of the piston 20. The piston 20 includes a non-magnetic operation part 22, a magnetic ascending and descending part 24, and a connector 26 which connects the operation part 22  
20 and the ascending and descending part 24.

The operation will be described. As shown in Figure 1, an electromagnetic field is formed in a solenoid in an initial stage, so the solenoid becomes an electromagnet. Since the magnetic ascending and descending part is disposed in the hollow part, the magnetic ascending and descending part 24 stays in the hollow part even though the solenoid becomes an electromagnet.

Figure 2 is a view illustrating an operation state when a certain load is applied to a user's body. When a certain force is applied to the operation part 22 by means of an external force, the piston 20 descends, and the ascending and descending part 24 becomes movable with the helps of a suction force of the electromagnet of the solenoid, so the descended piston 20 ascends again by means of a magnetic force. The spring 30 connected with the piston 20 prevents an escape of the piston from the hollow part when the piston 20 descends. The spring compressed when the piston 20 ascends further applies an elastic force to the piston 20 with its recovery force, by means of which vibrations repeatedly occur.

In the above-described vibration method, the solenoid body 10 is fixed at a certain member (not shown), and its operation is stopped. In this state, an electromagnetic force is generated in the solenoid 16, and an external force is applied to the piston 20, and the operation part 22 of the piston is inserted into the hollow part 18 and is pressed, and the ascending and descending part 24

moves to where a suction force is received. At the same time, the piston 20 vibrates by using a recovery force of the compressed spring 30.

Since the above vibration method adapts a spring 30 for an elastic force of the piston while preventing an escape of the piston, a complicated configuration is needed in order to install a spring in the vibration apparatus. A  
5 complicated configuration is further needed for fixedly supporting the solenoid body 10, so that the entire configurations of the vibration apparatus are complicated.

Since it is possible to obtain a desired vibration level by using a  
10 repulsive force of the spring 30 while applying a certain force by means of which a repulsive force of the spring 30 can be generated by pressing the operation part 22 of the front end of the piston engaged with the spring and while compressing the spring 30. The above methods can be applied when a certain weight is applied like in a mat or a bed, but cannot be properly applied to a  
15 vibrator which is basically used by naturally placing the same on a user's neck or shoulder.

## DISCLOSURE OF THE INVENTION

Embodiments of the present invention seek to provide a wearable belt  
20 massage apparatus which may be configured as being naturally worn on a user's

body while preventing any load to a user's hands or arms for thereby efficiently massaging a user's neck or back.

Embodiments of the present invention also seek to provide a wearable belt massage apparatus which can use a solenoid by means of which vibrations  
5 automatically occur when it is simply placed on a user's neck without applying an external force.

Embodiments of the present invention further seek to provide a wearable belt massage apparatus which may make it possible to minimize noises which occur due to a contact friction between a piston reciprocating in a  
10 hollow part of a solenoid body and an inner wall of a hollow part.

According to an aspect of the present invention, in a belt massage apparatus which includes a belt being wearable on a user's neck with a wing part being symmetrically formed with respect to its center portion, a vibrator which is formed of a solenoid body disposed in a center of the belt and has a  
15 hollow part for massaging a user's body contacting with the center of the belt, and a piston inserted in the hollow part and driven, a control unit for controlling the vibrator, and a button part for transmitting an input signal to the control unit, there is provided a wearable belt massage apparatus characterized in that when the massage apparatus is worn on a user's neck or shoulder, the solenoid  
20 body surface-contacts with an inner surface of the massage apparatus, and the

piston contacts with an inner surface of the massage apparatus, and when electric power is supplied to the solenoid body, part of the piston comes out of the hollow part, and a certain space is formed between the solenoid body and an inner surface of the surface-contacting massage apparatus, and the solenoid  
5 body descends by gravity, and part of the piston returns to the hollow part.

The wing part may be further equipped with a heater unit controlled by the control unit through the button part.

The heater unit may contain a heating cable and jade powder or stone powder which can absorb heat generated from the heating cable for thereby  
10 obtaining a weight balance with respect to the center of the belt equipped with the vibrator.

A hand ring may be further attached to both ends of the belt.

A control unit disposed between two vibrators may be provided in the center of the belt, and a cushion material contacting with the vibrator and the  
15 control unit may be further provided in the center of the belt.

The massage apparatus may be further equipped with a closable pocket for accommodating the vibrator.

The piston may be formed of a non-magnetic operation part and a magnetic operation rod engaged with the operation part.

20 The length of the piston may be longer than the length of the hollow part, and

an O-ring groove may be formed on a surrounding surface of the operation rod at a regular interval, and an O-ring is engaged in the O-ring groove.

A silicon membrane may be formed on a surrounding side surface of the operation rod.

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## EFFECTS

The wearable belt massage apparatus according to embodiments of the present invention may have the following advantages.

First, a wing part is symmetrically configured with respect to a center part in a belt shape being wearable on a user's neck, so a wearable belt massage apparatus can be naturally wound around a user's neck for thereby efficiently massaging a user's neck or back without providing loads to a user's hands and arms.

Second, since a wearable belt massage apparatus can operate without applying an external force to a vibrator, it may be possible to naturally massage the whole portions of a human body.

Third, since a vibrator is designed to vibrate based on a self-weight of a solenoid body without using a spring, it may be possible to easily manufacture a massage apparatus equipped with a simple structure vibrator.

20 Fourth, a silicon ring or a membrane is formed on an outer surface of a

piston which reciprocates in a hollow part of a solenoid body, so the noises occurring due to a contact friction with an inner wall of a hollow part can be effectively minimized.

## 5 BRIEF DESCRIPTION OF THE DRAWINGS

The present invention will become better understood with reference to the accompanying drawings which are given only by way of illustration and thus are not limitative of the present invention, wherein;

Figures 1 and 2 are views illustrating an operation state of a vibration  
10 method of a conventional massage apparatus;

Figure 3 is a view illustrating a wearable belt massage apparatus according to the present invention;

Figure 4 is a block diagram illustrating an operation state of a wearable belt massage apparatus according to the present invention;

15 Figure 5 is an inner perspective view illustrating a center of a wearable belt massage apparatus according to the present invention;

Figure 6 is a perspective view illustrating a cushion material which is disposed in a center of a wearable belt massage apparatus according to the present invention;

20 Figure 7 is a perspective view illustrating a heater unit of a wearable belt massage apparatus according to the present invention;

Figures 8 through 10 are views illustrating an operation state of an operation principle of a vibrator according to the present invention;

Figures 11 and 12 are views illustrating an operation effect of a hand ring according to the present invention;

5        Figures 13 and 14 are views illustrating a structure of a piston used in a vibrator according to the present invention; and

Figures 15 through 17 are views illustrating a use state of a wearable belt massage apparatus which is used in a suspending type according to the present invention.

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## MODES FOR CARRYING OUT THE INVENTION

The wearable belt massage apparatus according to the present invention will be described with reference to the accompanying drawings.

Figure 3 is a view illustrating a wearable belt massage apparatus according to the present invention. Figure 4 is a block diagram illustrating an operation state of a wearable belt massage apparatus according to the present invention. Figure 5 is an inner perspective view illustrating a center of a wearable belt massage apparatus according to the present invention. Figure 6 is a perspective view illustrating a cushion material which is disposed in a center of a wearable belt massage apparatus according to the present invention.

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Figure 7 is a perspective view illustrating a heater unit of a wearable belt massage apparatus according to the present invention.

As shown therein, the massage apparatus for massaging human body comprises a belt 100 which is wearable on a user's neck since a wing part 140 is symmetrically formed with respect to a center part 120.

The belt 100 is preferably made of a woven material for enhancing a wearing feeling, and the center part 120 of the belt 100 is equipped with a vibrator 200 and a control unit 300 which controls the vibrator 200.

The control unit 300 is equipped with an input terminal for receiving an electrical power and an output terminal for supplying the inputted power to the vibrator.

The massage apparatus according to the present invention might be equipped with a power plug for a connection with a receptacle of a building for supplying power to the control unit 300 or the massage apparatus might be equipped with a battery or a chargeable apparatus for the purpose of portability. The present invention is not limited to the above disclosed power supply methods, namely, it can be implemented in various methods.

The wing part 140 of the belt might be equipped with a button part 400 for transmitting an input signal to the control unit 300. The button part is equipped with functional keys by means of which a user can control an on and

off operation of the control unit 300 of the massage apparatus or the levels of vibrations of the vibrator 200.

The wing part 140 is further equipped with a heater unit 500 controlled by the control unit 300. In other words, a user presses a functional key of the button part 400 when the user wants to operate the heater unit, and the input signal is transmitted to the control unit 300, and the control unit 300 turns on or off the heater unit 500. The control unit 300 might be equipped with a temperature sensor for maintaining the temperature of the heater unit 500 at a set level.

The heater unit 500 might be made of a heating cable and a certain material containing a certain amount of medium which can absorb heat generated by means of the heating cable. The material contained in the heater unit 500 is made of stone powder or jade which can absorb the heat of heating cable while maintaining a certain weight balance with the center part of the belt equipped with the vibrator.

The whole weight of the massage apparatus of which surfaces are covered with the woven material of the present invention corresponds to the weight of the vibrator 200. When a user wears a massage apparatus on his/her neck, the center part 120 equipped with the vibrator 200 is positioned on a backside of a user's neck. At this time, the massage apparatus might fall down

from the backside of the user's neck due to the weight of the vibrator 200. In order to prevent the above phenomenon, stone powders or jade powders are contained in the heater unit 500 of the wing part 140 of the belt by a certain amount, respectively. So it is possible to efficiently absorb heat while warming a user's chest portion.

The heat absorption material having a certain weight is not limited to the disclosed stone powder or jade powder. Any material, which can absorb heat from the heating cable such as metals, sand, gravel or something, can be possible while maintaining a weight balance with the center part of the belt with a vibrator.

The present invention is characterized in that a material having a certain weight is provided so as to meet a weight balance of the belt massage apparatus while absorbing the heat like stone powder or jade powder and preventing the belt massage apparatus from being fallen down in one side during a wearing of the same due to the weight of the center part of the belt with the vibrator.

A hand ring 600 might be attached to both ends of the belt 100. A user's arm might be inserted into the hand ring 600 while holding the same with hands, so the user's hands or arms do not receive a lot of load. It can also help control the vibration levels of the vibrator 200, which will be described later in details.

More preferably, the center part 120 of the belt 100 is equipped with two vibrators 200 and a control unit 300 between the vibrators 200. The center part 120 might be further equipped with a cushion member 700 which can contact with the vibrators 200 and the control unit 300, respectively.

5           The cushion 700 can prevent any damage occurring as the vibrators 200 and the control unit 300 contact with each other when the center part 120 is folded. In addition, the center part 120 might be formed in a convex shape by means of which it feels better when contacting with a user's neck, shoulder or back.

10           The vibration method of the massage apparatus according to the present invention will be described as follows in detail.

The vibrator 200 is configured to generate vibrations using a solenoid. The vibrator 200 according to the present invention comprises a solenoid body 220, and a piston 240.

15           As shown in Figure 5, the massage apparatus according to the present invention is further equipped with a closable pocket 160 made of a woven material for accommodating the vibrator 200 for supporting the vibrator 200 installed in the massage apparatus and for an easier check and exchange of the vibrator 200.

20           Figures 8 through 10 are views illustrating an operation principle of the

vibrator according to the present invention. The solenoid body 220 is equipped with a hollow part 221, and the piston 240 is inserted into the hollow part 221. A bobbin 223, namely, a solenoid 224, wound with a magnetic coil 222 is provided in the interior of the solenoid body 220 for generating a suction force when it becomes an electromagnet when electric power is supplied thereto.

Figure 8 is a view illustrating when a solenoid surface-contacts with a certain surface A, with the piston being inserted into the hollow part of the solenoid body. In this case, one cross section of the piston 240 inserted into the hollow part 221 surface-contacts with the surface A like the solenoid body 220. Since the piston 240 according to the present invention is not engaged with a certain elastic support member like a spring, the piston 240 can directly contact with the surface A by gravity.

Figure 9 is a view illustrating a state that electric power is supplied to the solenoid. When electromagnetic force occurs as electric power is supplied to the magnetic coil 222, the piston 240 pressurizes the surface A contacting with the piston by means of a suction force of the electromagnetic force, so part of the piston 240 comes out of the hollow 221.

A certain space S is formed in the surface A contacting with the solenoid body 220.

Figure 10 is a view illustrating a state that the solenoid body descends

by means of gravity and contacts with the surface A. At the time when the suction force of the solenoid 224 becomes weak or is offset, the solenoid body 220 having a certain space S with the surface A descends by means of gravity.

The solenoid body 220 descends and pressurizes the surface A by means of the suction force, and part of the piston 240, which has come out of the hollow part 221, is inserted into the hollow part 221 again.

The above operations are repeatedly performed for thereby obtaining vibrations according to the present invention.

The piston 240 includes a non-magnetic operation part 242 formed at its front end, and a magnetic operation rod 244 engaged with the operation part 242. The operation part 242 and the operation rod 244 are engaged by various methods such as a thread engagement, an adhering engagement or a thermal and melting method. It is obvious that those who skilled in the art can select a desired method among the above methods without limiting to the disclosed methods.

The operations that the piston 240 formed of the magnetic operation rod 244 and the non-magnetic operation part 222 is inserted into the hollow part 221 of the body solenoid body 220 will be described. As shown in Figure 8, the solenoid body 220 in which the piston 240 is inserted surface-contacts with the surface A, and the operation part 242, which is a front end of the piston, is

inserted into the hollow part 221, and the surface of the operation part 242 surface-contacts with the surface A.

Part of the operation rod 244 is inserted into the hollow part 221. In case of the vibration method of the present invention, the above stage is an initial  
5 stage before the electric power is supplied to the solenoid 224.

In a state that almost parts of the magnetic operation rod 244 are inserted into the hollow part 221 or passes through the same, since the solenoid 224 does not move by means of suction force without moving even when it becomes a magnet, it is needed to change to a state that the stopped state of  
10 the piston 200 moves by means of suction force with the helps of external force.

In the initial state according to the present invention, when electric power is supplied to the solenoid 224, the piston 240 moves by means of the suction force, so the solenoid body 220 in which the piston 240 is inserted surface-contacts with the surface A, whereby the piston 240 moves.

15 In other words, in order to vibrate the piston in a state that the solenoid body is fixed and supported like in the conventional vibration method, the front end of the piston is protruded upward from the hollow part of the solenoid body for easily receiving an external force, and a rear end of the piston is configured so that the force is applied in the opposite direction by generating a suction  
20 force of the solenoid and a repulsive force of the spring when an external force

is applied.

It is needed to apply a certain level of an external force enough for compressing the spring until it reaches an initial stage of the present invention.

So, the front end of the piston is protruded upward from the hollow part of the

5 solenoid body in a configuration for receiving an external force.

The external force applied to the front end of the piston corresponds to a force enough for obtaining vibrations by generating a suction force of the solenoid and a repulsive force of the spring installed in the lower side, namely, it is needed to a relatively big external force similar with the weight of a human

10 body. So, there is a big difference as compared with the vibration method of the present invention which is basically directed to generating vibrations with a simple surface contact.

Namely, the conventional vibration method is greatly different with the present invention characterized in that there are elements used for returning to

15 an initial stage using the gravity of the solenoid body.

As shown in Figure 9, when an electric power is supplied to the solenoid, a suction force by means of an electromagnetic force is applied to the magnetic operation rod 244, so the operation rod 244 moves into the hollow part 221 with the helps of the suction force of the solenoid 224 without applying an external

20 force to the piston 240.

The whole parts or part of the operation part 242 comes out of the hollow part 221 while the operation part 242 pressurizes the contacting surface A by means of a suction force, and a certain space is formed between the solenoid body 220 and the surface A contacting with the solenoid body.

5 As shown in Figure 10, the space S between the solenoid body and the contacting surface is removed as the solenoid body 220 descends by gravity and the solenoid body 220 surface-contacts.

The whole parts or part of the operation part 242, which has come out of the hollow part 221 by means of the suction force of the solenoid 224, is  
10 inserted into the hollow part 221 and returns to its initial stage.

In more details, an initial stage is obtained when the solenoid body 220 descends by gravity, and the whole portions or part of the operation part 242, which has come out of the hollow part 221, are inserted into the hollow part 221 after the operation rod 244 is completely disappeared or almost parts of the  
15 same are inserted into the hollow part 221 by means of the electromagnetic force of the solenoid 224.

The vibrations are obtained as the above operations are repeatedly performed.

As shown in Figures 8 through 10, it is preferred that the length of the  
20 piston 240 is longer than the length of the hollow part 221, so that part of the

operation rod 244 comes out of the hollow part 221 when the solenoid body surface-contacts with the piston being inserted into the solenoid body. In the initial stage of the present invention, it is preferred that part of the operation rod 244 inserted into the hollow part 221 comes out of the hollow part 221 and can  
5 move by means of a suction force to the extent that the operation rod 244 can move as a suction force is applied by means of an electromagnetic force of the solenoid.

Figures 11 and 12 are views illustrating a state before or after a hand ring is pulled according to the present invention. As shown in Figure 8, a  
10 vibration strength of the vibrator might be weakened due to the area of the surfaces of the woven pocket 160 and belt 100 disposed between the vibrator 200 and a user's body in a state that the massage apparatus is supported by part of the user's body.

The strength of the piston 240 of the vibrator 200 might be slightly lower  
15 than the maximum level when the operation part 242 is slightly protruded from the hollow part 221 due to a curved surface of the woven pocket 160 and belt 100.

When a user pulls a hand ring 600, it is possible to compress the volume of the belt by tightly expanding the surfaces of the pocket 160 and the  
20 belt 100 which contacts with a user's body, so a vibration strength of the piston

240 of the vibrator 200 can be made stronger for thereby more efficiently massaging a user's body.

The present invention is characterized in that the piston has a certain configuration for minimizing the noises by decreasing the frictions while the piston moves in the hollow part. In particular, a lot of noises might occur due to friction in a space with the inner wall of the hollow part 221 in the magnetic operation rod 244 of the piston.

Figure 13 is a perspective view illustrating an operation rod according to a first embodiment of the present invention. The magnetic operation rod 244 of the present invention is equipped with an O-ring groove 244a on a surrounding surface at a regular interval.

The O-ring groove 244a is equipped with an O-ring 244b, and it is preferably made of a silicon material. The interval between the O-ring 244b and an inner wall of the hollow part 221 is preferably in a range of 0.2 through 0.7mm. Lubricant is applied on a surrounding portion of the operation rod 224 for minimizing the noises by promoting a sliding work.

Figure 14 is a perspective view illustrating an operation rod according to a second embodiment of the present invention. A silicon membrane is formed on a surrounding surface of the operation rod.

A silicon membrane 244c can be formed on a surrounding surface of the

operation rod 244 in a thin form. It is preferred that a shoulder 244d might be formed in a side of the operation rod 244 for preventing an escape of the silicon membrane 244c.

It is preferred that an interval between the silicon membrane and an inner all of the hollow part is in a range of 0.2 through 0.7mm. A plurality of shoulders 244d might be formed. The configuration of the shoulder 244d is not limited only when it is capable of preventing an escape of the silicon membrane. The present invention does not require a specific shape or configuration of the shoulder, and its arrangement does not matter.

Figures 15 through 17 are views illustrating the application of the vibration apparatus using a solenoid according to the present invention.

The massage apparatus to which a vibration method using a solenoid according to the present invention is capable of generating vibrations in a different manner as compared to a conventional vibration apparatus which uses a repulsive force of the spring. So, it is possible to generate vibrations without applying a lot of external force to the piston, corresponding to the weight of a human body, in order to generate repulsive force. The present invention can be naturally placed on a user's body for the use for thereby obtaining a desired massage effect.

The massage apparatus according to the present invention can be used

by wearing on a user's neck or can be used with a user lying on a floor. When it is used by wearing on a user's neck, the user's chest can be warmed by means of a heater unit, and it is possible to massage with the belt being worn on a user's neck, and with a user's hands or arms being supported by means of a hand ring, by means of which a user can comfortably receive a massage without any loads to hands and arms.

As the present invention may be embodied in several forms without departing from the spirit or essential characteristics thereof, it should also be understood that the above-described examples are not limited by any of the details of the foregoing description, unless otherwise specified, but rather should be construed broadly within its spirit and scope as defined in the appended claims, and therefore all changes and modifications that fall within the meets and bounds of the claims, or equivalences of such meets and bounds are therefore intended to be embraced by the appended claims.

## CLAIMS

What is claimed is:

1. In a belt massage apparatus which includes a belt being wearable on a user's neck with a wing part being symmetrically formed with respect to its center portion, a vibrator which is formed of a solenoid body disposed in a center of the belt and has a hollow part for massaging a user's body contacting with the center of the belt, and a piston inserted in the hollow part and driven, a control unit for controlling the vibrator, and a button part for transmitting an input signal to the control unit, a wearable belt massage apparatus characterized in that when said massage apparatus is worn on a user's neck or shoulder, the solenoid body surface-contacts with an inner surface of the massage apparatus, and the piston contacts with an inner surface of the massage apparatus, and when electric power is supplied to the solenoid body, part of the piston comes out of the hollow part, and a certain space is formed between the solenoid body and an inner surface of the surface-contacting massage apparatus, and the solenoid body descends by gravity, and part of the piston returns to the hollow part.

2. The apparatus of claim 1, wherein said wing part is further equipped with a heater unit controlled by the control unit through the button part.

3. The apparatus of claim 2, wherein said heater unit contains a heating cable and jade powder or stone powder which can absorb heat generated from the heating cable for thereby obtaining a weight balance with respect to the center of the belt equipped with the vibrator.

4. The apparatus of any one of the preceding claims, wherein a hand ring is further attached to both ends of the belt.

5. The apparatus of any one of the preceding claims, wherein a control unit disposed between two vibrators is provided in the center of the belt, and a cushion material contacting with the vibrator and the control unit is further provided in the center of the belt.

6. The apparatus of any one of the preceding claims, wherein said massage apparatus is further equipped with a closable pocket for accommodating the vibrator.

7. The apparatus of any one of the preceding claims, wherein said piston is formed of a non-magnetic operation part and a magnetic operation rod engaged

with the operation part.

8. The apparatus of any one of the preceding claims, wherein the length of the piston is longer than the length of the hollow part.

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9. The apparatus of claim 7, wherein an O-ring groove is formed on a surrounding surface of the operation rod at a regular interval, and an O-ring is engaged in the O-ring groove.

10 10. The apparatus of claim 7, wherein a silicon membrane is formed on a surrounding side surface of the operation rod.

11. The apparatus of claim 10, wherein a shoulder is formed on a side surface of the operation rod in order to prevent an escape of the silicon

15 membrane.

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